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PSYCHOLOGY :
THE CHANGING OUTLOOK



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PSYCHOLOGY: THE CHANGING OUTLOOK

BY

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PREFACE

A CHIEF DIFFICULTY in attempting to write a short book of this kind necessarily lies in the selection of a few points from a very large amount of material to put before the reader, and yet to give him some fair indication of the position of the science of psychology at the present time. The author can lay no claim to having done more than to provide an outline sketch which needs filling in by details that can be found in the more lengthy writings of those who frame psychological theories and apply them to practical issues. But, if *Psychology: The Changing Outlook* makes nothing else clear, it is hoped that it will at least indicate the great activity that is being displayed in various directions, and the energy with which psychological problems are being followed up by the representatives of the different points of view of psychology to-day. Even as presented here in a summary fashion, much confusion and some contradiction will be apparent between doctrines advanced in different quarters; and the author has not attempted to criticize these doctrines in detail, nor, except in a very tentative way, to find points of agreement between them. Scientific psychology must be said to be still in a state of transition, and not yet finally to have found its feet. It would be premature to try to make any confident prediction as to what its final outcome will be. On the other hand, some at least of these doctrines have resisted all criticisms and are likely to stand good; while, as

will be seen, there are certain pragmatic or utilitarian tests that others have satisfied. The applications of psychological theory to practical problems, of education, medicine, and industry in particular, have in many instances been highly successful. And, if success in application is any touchstone of truth, those doctrines as well as the others would seem bound to survive in any future coherent and unified science of psychology.

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LOOKING BACKWARDS

CHAPTER I

THE OLD PSYCHOLOGIES.—I

IT is only of comparatively recent years that psychology has drawn to itself any very widespread attention on the part of the general public ; and such interest as they show in it has chiefly been aroused by some of its more sensational theories and spectacular achievements in the sphere of medical and abnormal psychology than by its rapid growth as a natural science. But during those same few years, more than at any other time, striking discoveries have been made that have allowed this branch of study to forge ahead and, instead of remaining merely one chapter in a body of somewhat speculative philosophy, to become a science already capable of practical application to many of the actual and urgent problems of life.

Yet, though of late it has made rapid strides forward, psychology is a very ancient science indeed, with a history behind it that stretches back almost to the beginnings of philosophical thought ; and there is evidence that even in prehistoric times men held beliefs regarding themselves and their destinies that could have had only a psychological origin. This was the old psychology that has now given place to the new. Or, better expressed, since one view has succeeded another in the course of the centuries, these were the old psychologies that at present

are dispossessed in favour not of a single and agreed new science, but of a number of attempts to create one.

To understand the state of psychological knowledge at the present day, and its applications to the practical affairs of everyday life, it will be helpful to cast a backward glance over the road along which it has travelled in the course of its transformation from being a branch of speculative philosophy to becoming an independent empirical or natural science. It will not be necessary to survey the whole length of that road; it will be enough to point to some only of the chief milestones by which progress has been marked, and to register the advances that have been made.

PSYCHOLOGICAL ORIGINS

Psychology, as a part of philosophy, began in a tangle of speculation and guesswork about the nature of the world and of man from which only little by little a number of definite problems came to be teased out by the early thinkers. At first the philosophers were more concerned to explain the world around them than to understand themselves, or to ask how they came to know the world, or what their knowledge of it was worth, or why they felt and thought and acted as they did. Only later on did psychological problems like these become clearly recognized and stated. In time, however, they were bound to arise. Problems concerning physical Nature implied questions about the ways in which we come to perceive the objects of Nature. Clearly, we perceive them by our senses. But what we thus perceive is always, they observed, in a state of movement and change, becoming something else even while we are perceiving it. Yet somehow we also know these objects as if they were fixed and changeless. Otherwise we could never identify them

and classify them. A man, for example, is born, grows up, endures for a time, and then dies. But "man" is essentially changeless, unaffected by the chances of space and time, and always identical with himself. And what is true here is true also of all the other objects of which we meet with only transitory examples in Nature. Are there then two worlds, the one changing and existing in time, the other changeless and eternal? Or are there rather two ways of knowing one and the same world? In either case a problem is set for psychology. How do we know things that do not fall within the scope of our senses? How do we make a permanent and changeless world from one of ever-changing and transient objects?

But the early philosophers were not only interested in problems of physical Nature. Before long they became curious as to questions of morality also; and this led them to a study of human actions and of the motives by which men are driven to the courses of conduct they pursue. Just as the problem of knowledge, which raised the further problem of the human powers of knowing, arose in the attempt to explain what the objects of Nature are made of and how they work, so the problem of moral action, which in the end raised further problems with regard to man's powers of doing, arose in the course of a discussion of the binding power of laws. Just as it had been asked if, amidst all the changes of the physical world, there was anything abiding and stable that could be known, so now it was asked if, among all the different positive laws of different States and the changing laws of the same State at different times, there was any fixed and changeless moral law that ought to be obeyed in its own right. Clearly, man-made laws, that are altered according to the changing needs of the moment, do raise the question as to whether they have any valid claim upon

our obedience. And, if they have any such claim, the further question then arises as to whence that claim is derived, and upon what it is based. But questions like these at once imply the problem of the human will, its obligations, and its freedom to obey or to disobey the laws.

Already in these two original problems concerning Nature and law we have a very large range of psychological topics involved, including those of sensation, perception, understanding, feeling, emotion, and will, which, at first almost by chance as it were, but later on deliberately, came to be discussed by the philosophers.

ARISTOTLE

By the time of Aristotle a fairly complete system of psychology is to be found developed in the concluding books of his treatise on physical Nature, and in his writings on moral subjects. The inclusion of psychology with physics is particularly interesting here as showing a general philosophical theory he applied in explanation both of physical and mental processes.¹ This theory is one that he advanced in order to account for the possibility of alteration or change of any sort in the objects of Nature, and also for the fact that different kinds of things differ from one another in their natures and properties. The theory is perhaps best developed by way of examples.

MATTER AND FORM

If a formless lump of clay is shaped into a lamp or vase by the potter, this can happen only because there is the clay to be shaped and the shape to be wrought into it. We may here omit a consideration of the potter who does

¹ Cf. *infra*, p. 53.

the shaping and of the goal at which he aims. Clay and shape together constitute the vase or the lamp ; and the clay itself is indifferent to either shape or form, since it may be moulded indifferently into each in turn. It is the form, or shape, that makes the material clay a lamp or a vase ; though without some form or other the clay could not exist at all. In the same way the form cannot exist alone ; it must be realized and expressed in some portion of matter, this or that bit of clay, or bronze, or glass, as the case may be. It is clear, however, that, apart from the properties that belong to the very nature of the substance that is used in making the article, all the properties of the vase considered *as* a vase, and of the lamp *as* a lamp, come from the form that has been impressed upon it by the potter ; so that, did we really know the forms of such things beforehand, as an architect might be said to know the plan of his building, we could deduce their properties from them.

The example given is a very simple one ; and the analysis of the lamp or vase into a common matter and, in each case, a definite shape or form is quite straightforward. It is true, the potter only produces a work of art, and he works in a material that already exists.

But both the example and the analysis can be used by analogy to account for the substantial differences that are observed to obtain between natural objects in the physical world. If we think of an original and absolutely indeterminate or formless material, and of a formative principle by which this material is determined so as to become a being of such and such a kind, we shall have reached a notion of a "substantial" form which determines and constitutes the nature of that being ; and, did our knowledge go deep enough down to the substantial form itself, we should then be able to deduce

and derive the properties and characters of the natural object from it. Obviously, however, we do not apprehend these substantial formal principles directly; we can only infer their natures from the different kinds of activity that are displayed by the several natural objects constituted by them.

LIFE AND SOUL

Now, included among these natural objects are living beings, plants, animals, and man; and in their case the form that makes them what they are is called soul. It is the soul-form that accounts for all their vital operations; and it is from a study of the different kinds of activities that we observe on the different levels of vegetable, animal, and human life that one will come to a knowledge of the natures of the different grades of soul. Though the outlook here is metaphysical, it is to be noticed that the method of study is empirical or that of natural science, and it rests ultimately upon the observation of likenesses, differences, and changes.

Pursuing this method, Aristotle divides the soul-forms into the nutritive, sensitive, and rational, each in turn capable of accounting for the functions of its predecessor as well as its own. Because of the nutritive soul, living organisms assimilate food, grow, and reproduce their kind. These functions, as well as those of sensation, perception, imagination, sensory judgement, memory, desire, and the power of movement, are performed by the animals, which are credited with sensitive souls; though it must not be supposed that all animals share alike either in the range or the degree to which they possess these powers. The human soul accounts for all the foregoing functions; and, over and above these, man has also the power of reason, or conceptual thinking,

which makes possible a form of desire that issues in deliberation, rational appetite, or truly human will.

Aristotle aims, as we have seen, at discovering the natures of the souls on the ground of the different powers or operations of the "besouled" living organisms; but, since these souls are no more than forms making portions of the original matter what they are, on the death of the organism the soul passes out of actual existence, just as the form of the vase perishes when the vase itself is broken into fragments. There is one possible exception; though on this point Aristotle is very obscure, and those who have attempted to interpret his meaning differ among themselves. But that exception is the human soul in its unique aspect of active reason. Just as, in sense knowledge, we receive the forms or likenesses of things without their matter (as wax receives, or is impressed with the figure without receiving the metal of the seal itself), so the passive understanding receives the abstract and universal forms that are the proper objects of intelligence. But, while individual things exist in Nature around us to impress us, abstract and universal ideas do not. How, then, can the understanding be affected by them? Aristotle answers this question by supposing the existence of an active power of reason which works upon the sensory impressions, or images, so as to produce an intelligible form or intellectual determinant; and this "informs" the understanding,¹ which reacts in knowing the abstract and universal. But what is this active intellect? Is it a faculty of the

¹ It is interesting to note that this doctrine of Aristotle regarding the understanding and the way it works has been preserved and handed down through the ages in ordinary forms of speech. We still use such expressions as "I am informed that . . .", "According to my information . . .", and the like.

individual soul, or something apart, yet in some sense shared by all men? While the sensory powers, memory, and even the passive understanding, are born and die with the bodily organism, Aristotle makes the active intellect independent of the body, with a pre-existence before birth and a survival after death. But whether he means a personal or impersonal immortality is still a matter of dispute.

AQUINAS

The highest and most complete development of Greek philosophical psychology may be said to have been reached with Aristotle; and in the main his teaching was handed on during the Middle Ages in the Arabian and Scholastic philosophies. Arabians and Schoolmen alike, however, were still occupied with the metaphysical problems of the nature of the human soul and the destiny of man; and both came under the influence of currents of thought, such as Platonism, that had their sources elsewhere than in Aristotle's writings. Those that flowed together and merged in the Scholasticism of the thirteenth century reached their high water mark in the philosophy of Thomas Aquinas, by whom the psychological doctrines of Aristotle were developed in a very characteristic way. Several points call for our attention here. In the first place, applying the doctrine of Aristotle that nothing exists in Nature except individual things, Aquinas concludes that the individual man is not two things, but one, not a soul *plus* a body, but a "be-souled" organism of a particular type. Again with Aristotle, he holds that thought involves an operation of a non-material kind in which the body, as such, does not share, except in so far as it supplies the materials for thinking; and, accordingly, he argues that a survival

after death is implied. But he decides definitely upon personal immortality in making the active intellect as well as the passive understanding an intrinsic power of the soul, and thus he concludes that it is the individual soul itself that survives the death of the body.

While, as we have seen, the interest in psychology during these many centuries centred upon problems such as those of the nature and constitution of man, his soul, and his future destiny, the philosophy that was built up around these problems rested upon empirical observations and analyses of mental process of a far-reaching kind. Indeed, according to the accepted axiom that a knowledge of the nature of any thing can be gained only by way of a close study of its activities, this must have been so. And in the study of the mental and physical activities of man both Aristotle and Aquinas brought to light a large number of psychological facts, and suggested explanations for them, that are still incorporated in the scientific psychology of the present day.

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CHAPTER II

THE OLD PSYCHOLOGIES.—II

DESCARTES : INTELLECTUALISM

THE next important milestone to be noted marks the teaching of the philosopher René Descartes in the seventeenth century. Breaking with the old traditions of Aristotle and the Schoolmen, Descartes developed his psychological teaching by way of a searching criticism of the value of knowledge. His starting-point was that of a methodical and universal doubt. Since so many opinions are uncertain, and so many beliefs turn out to be false, would it not be best, he asked, to doubt of everything in order to discover if there may be anything that really cannot be doubted? Pursuing this method of doubting, the philosopher at length discovered what for him was absolutely beyond any shadow of doubt; and he expressed this in his famous formula: "I think; therefore I am." This formula he held to be the statement of a self-evident truth, so clearly and so distinctly perceived as to admit of no doubt whatever. And from this first truth Descartes went on to derive the principle that everything must be true which is as clear and distinct as self-consciousness is. Furthermore, on this principle, by what he calls a geometrical argument, he based one of his "proofs" of the existence of God. For, he reasoned, when we examine our idea of God, we find that this is an idea of the most perfect Being, whose perfection must necessarily include actual existence. God, therefore, exists. And from the goodness and wisdom of this

existent Deity the trustworthiness of the faculties of the human mind is to be inferred. By this vicious circle of reasoning, Descartes reached the position of asserting that our senses are to be trusted when they inform us of the existence of an external world, the essence of which is seen to be extension.

BODY AND MIND

This very brief sketch of the general position of Descartes is necessary if we would understand his psychology. For it leads us to his doctrine of the Two Substances, the mind, or self, known by direct intuition as a thinking thing, and matter, known to us by inference as extended. The very essence of the former is thought, while that of the latter is extension. Mind and matter are thus not only contrasted with one another, but are so opposed to each other as to have nothing whatever in common. This opposition divorces psychology entirely from physiology; and, instead of regarding the "besouled" organism, man, as a psycho-physical, or body-mind, unity, all of whose operations and activities are to be studied, it requires that we should regard him essentially as a duality, thus raising in an acute form the problem of the relation of mind to matter, the solution of which has fruitlessly puzzled subsequent philosophers to the present day.

Descartes's own solution was that of an interaction of a mechanical kind, the seat of which he located in the pineal gland of the brain. The living body works on entirely mechanical principles, in virtue of which sensory impulses are conveyed by a very subtle fluid (the so-called "animal spirits") to this gland, thence to return to the muscles as impulses that issue in movements. As regards the lower animals, this is to be taken as a com-

plete account of the matter ; for nothing else occurs. The animals experience no conscious sensations, but only exhibit this automatic, machine-like reaction to stimulation. In man, however, the movements of the "animal spirits", entering the pineal gland, provoke conscious mental feelings or passions ; and the activities of the mind, that brings about movements of the body by its application at the same point of juncture, are experienced as mental actions. Actions and passions alike are included together under the head of "thoughts", which embrace sensation, imagination, idea, emotion, and volition.

The influence of this teaching of Descartes was profound, not only upon the contemporary and subsequent philosophical thought, but also upon the popular mind ; and, just as many of the technical terms of Aristotelian and Scholastic philosophy had become incorporated into the language of ordinary culture, and remain so incorporated to the present day, so this mind-body dualism came to be taken over by that body of commonly received opinion that passes for common sense. Despite his acknowledged contributions to physical science and to mathematics, the deductive method Descartes pursued prevented him from treating psychology in any other way than as a branch of philosophy ; and even less than before was it on the way to becoming a natural science.

JOHN LOCKE : EMPIRICISM

About the same time that Descartes was elaborating his theory, the basis of a thorough-going empiricism was being established by John Locke, "the father of English psychology". Concerned, as he was, to construct a theory of knowledge, Locke undertook to make a critical analysis of experience, in which all knowing is traced

back to its origins in sensation, or the perception of external phenomena, on the one hand, and reflection, or the perception of internal acts of the mind itself, on the other. Complex ideas, formed by the understanding in the process of repeating, comparing, and combining simple ideas, depend upon these latter as presented by sensation and reflection to the passively receptive mind.

Locke's importance for psychology lies in the fact that he worked out this theory on empirical lines. Further, though he himself stressed the independence of inner experience as a source of ideas, thus treating the higher, intellectual activities of the mind in the narrower sense as incorporeal and independent of the body, yet his view that these activities could work only on sensations dependent on the activity of bodily organs easily led to a transformation at the hands of his followers into a complete psychological sensism, in which the mind, or consciousness, was reduced to a collection of sensations variously put together.

From this point on, scientific begins to divide from philosophical psychology and takes on increasing importance, though for the most part it is merely descriptive rather than explanatory. In summary, it may be said that the two lines of thought that derive from the Rationalism of Descartes and the Empiricism of Locke developed in two different directions, the one tending to solve the body-mind problem by reducing matter to mind, the other, contrariwise, by reducing mind to matter.

DAVID HUME: SENSISM AND ASSOCIATIONISM

But in the eighteenth century a new solution of the problem was put forward by Hume, in which the substantial reality of both matter and mind was simply denied; and, so far as mind is concerned, this was made

to consist of impressions (Locke's sensations and reflections, such as we experience when we see, hear, will, love, and the like) and ideas, which are no more than fainter copies of the impressions. Moreover, the principles by which our ideas are related were asserted to be associations by way of resemblance, contiguity in space and time, and causality; all of which were held ultimately to be derived from the original impressions themselves. Thus mind is reduced to nothing more than "a heap or collection of different perceptions united together by certain relations, and supposed, though falsely, to be endowed with simplicity and identity."

The radical rejection of mind in any other sense than this by Hume, coupled with the teaching of his contemporary Hartley, who explained all mental process as due to "vibrations" in the nervous system, laid the foundations of sensism or associationism, the "academic psychology" that was dominant throughout the greater part of the nineteenth century. This psychological system that admitted only sensations, ideas, and associations between them, as together making up consciousness, was worked out at great length by writers like Bain in this country and Taine in France; and it held the day until, towards the beginning of the present century, a general revolution of practically all psychologists against it took place because of its utter barrenness and insufficiency.

EXPERIMENTAL PSYCHOLOGY

While the school of associationism begun by Hume and Hartley was developing, however, another line of thought was being followed up that planted milestones of its own on the road finally leading to the establishment of psychology as an experimental science. Even at the

beginning of the nineteenth century, Herbart had wished to apply mathematics to psychological data, and attempted to work out a statics and dynamics of ideas within the framework of associationism. Though his attempt was a failure, he was thus in a sense the forerunner of Weber, Fechner, and Wundt, in whose hands the application of mathematics to psychology had a greater success. Weber, for instance, established a serial relationship between sensations of the same kind, that could just be distinguished from one another as greater or less, and the strength of the stimuli that give rise to them; and, as the result of his experiments, Fechner formulated the law that such just distinguishable sensations arranged in an arithmetical order correspond to physical stimuli the intensities of which increase in a geometrical order. Here an attempt was made to measure psychological phenomena by reference to a physical scale, and so to establish a mathematical relation between psychology and physics.

Interesting as this attempt was from the point of view of theory, no important practical purpose was served by psychometry, as it was called; and, with the exception of the measurement of thresholds, it was only in the second half of the last century that mathematics, in the shape of statistical method, began to be fruitfully applied to psychological problems.

W. WUNDT

The last milestone to be raised on the road leading from philosophical to scientific psychology marks the foundation of the first laboratory of experimental psychology at Leipzig by Wilhelm Wundt in 1897. Much work having a bearing on psychological problems, had, it is true, already been carried out in laboratories of physics and physiology; but this had mostly been undertaken with

physical and physiological, and not psychological, interests in view. Now for the first time, however, psychology becomes an independent experimental science in the full sense of the term. It is interesting, moreover, to note Wundt's opinions with regard to the scope and method of the science as a whole. In his view psychology is based upon experience, not, as with Locke, distinguished into inner and outer, but taken at its face value as neither necessarily bodily nor mental; for there is no way of deciding beforehand whether its origin is physiological or independent of physiological conditions. The psychologist, accordingly, will employ any and every available means of studying experience, with complete indifference to any prejudice of method. In some cases introspection will be used, in other cases physiological conditions will be studied; behaviour will be observed and interpreted, animal and child life will be investigated; while in some directions there will be no other way of approach than through the study of the products of mind, in language, myth, art, religion, and the like. For Wundt the method of psychology is really a composite one, and the following up of any avenue of research that promises results.

Wundt's influence upon the development of contemporary psychology was very great. The founding of his own laboratory was speedily followed by the establishment of others wherever psychology was, or then began to be, studied as a natural science; and the output of these laboratories has since been enormous. Moreover, the indifference of method upon which he insisted opened up many fields for further exploration; and psychologists were not slow in entering upon these, as the present state of psychology amply witnesses. Though this has made for greatly increased specialization and often even

for the appearance of disagreement among the specialists, it has really proved of considerable advantage to the youthful and still growing science. For, though many of the conclusions reached will no doubt require revision, and even rejection, others appear to be solidly established and have stood the very convincing pragmatic test of applicability to the practical affairs of actual everyday life and living.

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LOOKING ON

CHAPTER III

NOEGENESIS

THOSE who have watched the changes taking place in the science of psychology during the present century have seen the gradual disintegration of the old academic system of sensism, elementarism, and associationism, and its final rejection in the breaking away of a number of groups of psychologists in search of new and better methods and theories. At first, realizing the insufficiency of the older views to explain human behaviour on the basis of sensations, ideas, and feelings, with their supposed tendencies to issue in action, some of the leading psychologists began to introduce other theories and explanations. But the academic tradition was still very strong for those who were brought up in it; and for a time its doctrines persisted side by side with the new ones. Thus mentally perceived objects, including the Self that does the perceiving, were still explained as being no more than complexes of elementary sensations and reproduced ideas; and the theory of ideo-motor action (that ideas tend to cause movements) was still invoked to account for our illusory belief in the human will and mental causation. Since the mind was regarded as being no more than the sum of its contents (the impressions and ideas), and since the sole law of mental process was taken to be that of association, this system of psychology had

no convincing meaning unless it was referred to physiological, and particularly to nervous processes occurring in the body. It was essentially an epiphenomenalism, or doctrine that mental events are no more than the by-products and accompaniments of physical events; and it was based on a purely mechanistic and materialistic foundation. Moreover, except that some practical use could be made of the law of association as applied to memorizing and acquiring bodily skills, the psychology of associationism was not applicable to the ordinary problems of everyday life. It was sterile, and it led nowhere. The newly suggested explanatory conceptions were hampered by these old doctrines; and wherever psychology was found to be useful in practice, this, it at last came to be realized, was largely in spite of them.

To be sure, before the end of the nineteenth century, and as an offshoot of the work inaugurated by Wundt, a development of the (experimental) introspective method¹ seemed to shed a new and brighter light upon the manner in which the mind actually works in its higher processes of thought, judgement, and volition. This work pointed to the occurrence of "imageless thinking", "active determining tendencies", and "mental attitudes", which, though not elements of consciousness in the sense in which the old impressions and ideas were held to be, nevertheless seemed to explain what happened better than did elementarism and associationism. But the results of this development did not make themselves at once generally apparent in systematic psychology. On the contrary, violent opposition was offered to them; and, though its citadel was attacked and already largely undermined, the academic associationism continued to

¹ By the Würzburg School. Cf. p. 72 *sqq.*

hold out ;¹ although, as has just been said, it was incapable of fruitful application to vital problems.

PRACTICAL PROBLEMS

Accordingly, since urgent practical issues that could be dealt with only by the help of psychology were arising in many directions, the then dominant theory came gradually to be jettisoned, and new empirical methods were explored in order to deal with them. This happened at first chiefly in the spheres of education and medicine ; but the movement quickly became extended to other fields, such as those of industry and commerce also, and has already begun to make itself felt in the spheres of law and criminology, economics and politics, as well, for the empirical method was found to provide data for theories of quite general application. What has already been accomplished in these directions shows that this science can be fruitfully applied wherever human nature enters as a factor into the problem to be solved. In this and the following chapters we shall have occasion to consider a number of examples of the solution of practical problems by such methods, and at the same time to indicate some of the more important theories that have arisen in connection with them. One outstanding example is that of the discovery of a means for the measurement of intelligence, which has had very far-reaching consequences in a large number of directions.²

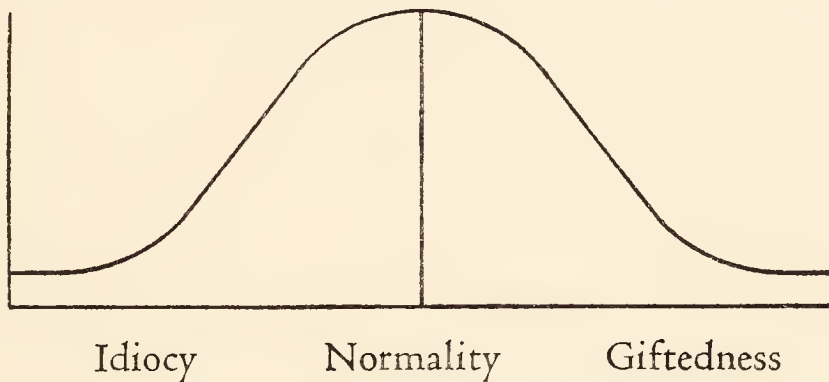
MEASUREMENT OF INTELLIGENCE

It had long been realized that individuals differ greatly from one another in intellectual ability ; indeed, in his

¹ For the sake of convenience in exposition, this development will be treated in a later chapter in connection with Behaviourism.

² For Intelligence Tests, see *The Nation's Intelligence*. J. L. Gray. This Series.

Hereditary Genius Sir Francis Galton (1869) described a scale of classification in a number of groups which would embrace all degrees of intelligence, ranging from idiocy to extreme giftedness. He assumed a "normal distribution curve" of intelligence, in which the degrees would be continuous, few individuals falling at the extremes while the majority cluster around the central value, as illustrated in the diagram below. Moreover, a considerable amount of work had been done in psychological and other laboratories in the way of



testing special mental powers, such as speed of reaction, sensory acuity, and memory.

But it was only at the beginning of the present century that a definite attempt was made to measure general mental ability. And this attempt was made in response to a practical problem set for psychology by the educationalists. The educational authorities of Paris were interested in the backwardness of some of the children attending the municipal schools. Was this due to faulty teaching methods, actual incapacity on the part of the backward children, or some other cause? In any case, they wished those who were backward to be picked out, in order that they might be given special teaching. The problem was handed over to the psychologist Alfred Binet for study. Binet was quite familiar with testing for special capacities,

and had been devising and employing such tests for a number of years. He now had to construct tests which would measure general capacity. Working on the assumption that normal children of any given age should have reached a certain level of intellectual development independently of the instruction given at school, Binet devised a number of simple tests to measure these levels at each age, and tried them out on a number of testees. He was thus able to standardize his tests so that, by applying them to any given child, he could ascertain to what mental, irrespective of chronological, age that child belonged. These tests were in no sense formal examinations; they did not depend upon what the child had been taught in school, but only on what he might have been expected to pick up in the course of his everyday life. They were not so much tests of knowledge, as of ability to handle knowledge.

Binet was what is called a "faculty psychologist"—that is to say, he held that the mind makes use of faculties in its operations, and that these mental powers may vary independently in strength. Thus a man may have a good intellect but a bad memory, or a poor memory but a strong imagination, and so on. Despite his faculty theory, however, Binet grouped together tests for each age that involved different faculties (memory, judgement, etc.) in an arbitrary way. He thus obtained results which he believed to indicate a "general level" of mental ability. Though on his own theory unsound and illogical, this procedure worked out well in practice; and the astonishing success of mental measurement by testing has subsequently more than justified its use.

NATURE OF INTELLIGENCE

If we ask why this should have been so, we must turn to another line of inquiry already begun before Binet's

tests were used to any very great extent. It had already been suggested by Charles Spearman that the results of a hodge-podge or pool of tests of quite different mental activities might be treated mathematically in such a way as to show how the mind actually works in any of its intelligent performances ; and it had been proved by him that if any two given mental abilities (for example, the power of judging of the length of lines by sight and that of distinguishing differences of musical pitch by hearing) tend to vary together in amount, then each of these abilities involves one factor common to both of them, as well as another factor peculiar to itself. Further, it was proved that if two pairs of such mental abilities are taken, and the appropriate calculations made, certain conditions being satisfied, then the factor common to the first is found to be also the factor common to the second pair. The proofs of these statements are mathematical and highly technical and need not be given here ; but the important conclusions derived from them may be summarized as follows. There is a single general mental ability, which is best conceived of as an intellectual energy, and this ability tends to be constant in amount for any given individual, but to vary in amount from one individual to another. This general energetic ability is involved in every kind of knowing, but not always to the same extent ; for in every case it acts in conjunction with some one or other special factor upon which success in any mental operation also depends. Moreover, the relative part played by each of these (general and specific factors) is variable in different mental operations. In some cases a great deal of general ability is required and little specific ; in others it is the other way round. As we shall see, this general ability is best identified with " intelligence " ; and, if we are to have good intelligence

tests, we should construct them so as to involve general ability in its purest manifestations and operating in the most unequivocal manner. (We may, of course, want to measure some special ability also; and in that case we shall use tests more appropriate to it.) So far as this "Theory of Two Factors" has already been outlined, nothing has been said as to how tests "saturated" with general ability (*i.e.*, that measure it in its purest form) are to be found; but following the same method of correlation it is not difficult to discover them; for it is possible, by measuring a number of mental performances, to submit the results to appropriate statistical treatment, and to calculate their correlations. From these correlations the degree in which any one of the tests tallies with a perfect measure of general ability can be obtained; and we then have the amount of saturation of the test in question.

These operations have actually been carried out in connection with a very large number of mental performances of various kinds; and a most important conclusion has been reached, upon which converge the results of quite another line of inquiry, also pursued by Spearman—that, namely, of introspective analysis and immediate inferences therefrom.

So very simple and obvious are these results that they hardly seem to require stating in words. Yet it is only of recent years that they have been advanced as psychological principles that can account basically for the origin of all our knowledge whatever, and that cover also whatsoever form that knowledge may subsequently take.

Introspection immediately acquaints us with the following facts. (1) We become aware at least of some of our experience, of some of its characters, and of ourselves as experiencing. (2) We observe relations of

various sorts that hold good between different items of our experience. (3) We create objects of thought that have never been experienced by us in any sensory manner. (4) We forget what we once knew. (5) We recall what we had forgotten. And (6) we find the things of which we are aware varying in clearness and distinctness.

These six mental processes, alone or in combination, it is claimed, render an account of all mental processes whatsoever, in the sense that any process of knowing without exception can be reduced to them. The first three show us how knowledge of any sort arises in our minds; the other three describe what may happen to items of knowledge once they have so arisen. Nor do these processes stop short at knowledge as merely contemplative. They must necessarily enter into any account of conscious behaviour and conduct as well. For, though mere processes of knowing may not of themselves alone be final explanations of *why* we behave in any way,¹ they do explain how the impulses that are the springs of action come to be unleashed, and also how the guidance of the nervous and muscular mechanisms by which behaviour is effected comes about.

Let us consider a very simple case in illustration of these points. A young baby will turn its head in the direction of a noise that it hears. The noise does not move the head; but the hearing of the noise brings about an impulse to the movement. Nor does the noise guide the movement towards it; the guidance is effected by the sensations coming from the serially moving parts, together with the sensations coming from the two ears, that alter while the movement is going on until the stimulation is equalized on both sides. A more complicated case, in which all the processes mentioned above may be involved, is that of the writing of

¹ Cf. Chapter VI.

a letter, or the composition of a book. The thought of the finished product, the idea of expressing oneself in writing the letter or the book, may indeed provoke a desire or impulse to work at it. But the actual writing is guided throughout by an incredible number of directive processes ; by sensations coming from the fingers and eyes, which are neatly co-ordinated in relation to one another, and secure the accurate translating of the thoughts into written words ; by the mental manipulation of the material to be embodied in the text ; by thoughts coming and going, and waxing and waning in clearness ; by fragments of memories weaving themselves into the creative flow of consciousness ; the whole, meanwhile, being bound together by relations of consistency and evidence.

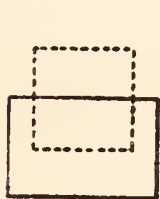
PRINCIPLES OF INTELLIGENCE

To account for the mental processes of perception and thought which thus stimulate and guide the impulses, desires, and interests that issue in behaviour, it is necessary to have recourse to principles or laws. These have been formulated by Spearman in two separate groups, the first group being of a formal or qualitative character, and defining the nature of the processes themselves, as well as indicating what kind of items can be known by us. Since they tell us how knowledge of any sort originally comes into being, they have appropriately been called "noegenetic" or "knowledge originating" principles. But they give us no information as to how, when, or to what extent, the processes to which they give rise are actually brought into operation. Accordingly, a second group of principles of a quantitative character is also supplied ; and these, as we shall see, not only render an account of the actual occurrence of the noegenetic

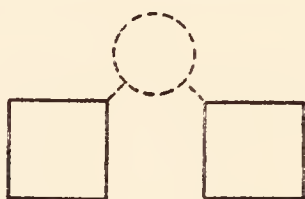
processes, but also of the alterations that take place in the items of our knowledge subsequently to their first appearance. It should be noted that the results, or products, of the three kinds of noegenetic process in which these principles come to expression are not only original, but are also self-evident, items of knowledge. Put into words, they may be exemplified by such statements as "I am angry", "hot is unlike cold", and "the square of three is nine". In these cases, the knowledge originated is "angry-self", "unlike", and "nine"; and it is in each case intuitively grasped as evident. There can be no question of its validity, no possibility of error. In this respect the knowledge in question may be very different from that due to retentivity, or to processes of thought in which retentivity, as well as noegenesis, contributes to the product. Here error may occur. For, as we shall see, the anoegenetic processes and their products, which occur in virtue of the fact that we have already been in possession of items of knowledge upon which the quantitative principles bear, are not genuinely insightful, and may lead us astray. The three noegenetic or "knowledge originating" laws express tendencies, and may be stated in the terms of the first three processes that have been listed above. They are as follows. (1) We tend to know the items of our experience—as, for instance, when we become aware of a colour, or odour, or sound, and of ourselves as being aware of them. (2) We tend to perceive various relations between such items—as, for example, when we see that one red is like another, or judge that one odour is more pleasant than another, or one sound louder than another, and the like. (3) We tend to think of a second item in a definite relation to a first, when the first item together with the definite relation are given—as, in illustration, when the idea

“short”, together with the relation “oppositeness”, generates the idea “long”; or “entity”, with the same relation, produces the idea of “nonentity”.

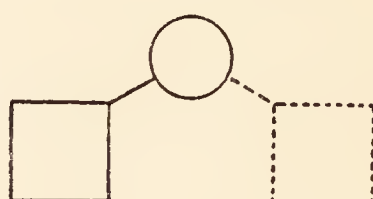
These three noegenetic principles may be illustrated by the following diagrams, a slightly modified form of Spearman's originals, as given in his *Creative Mind*.



Principle of
Experience.
FIG. 1.



Principle of
Relations.
FIG. 2.



Principle of
Correlates.
FIG. 3.

In these diagrams the continuous lines represent occurrence, and the dotted lines tendency. Fig. 1 shows the occurrence of experience and the tendency to know it; fig. 2, the occurrence of known items of experience and the tendency to apprehend relation between them; fig. 3, the occurrence of a known item together with a known relation and the tendency to think of a correlated item.

It may be said that the processes due to these noegenetic laws, and especially to the third, yield examples of purely creative intellectual operations. It is by such processes, and according to such principles or laws, that we are able to think of such things as infinity, eternity, immortality, perfection, the square root of minus one, God, hydra-headed monsters, and the like, which, whether they actually exist or not, may certainly be objects of our thought, since they mean something to us and we have words to express them. No one has ever experienced any one of these things, perhaps never will, and possibly never could. It is by such processes also that artists

produce their "imaginative" works of art, plastic, literary, musical, pictorial, and the like. These are no mere copies, if indeed they are works of art, nor merely reshuffled fragments of previous sensory experiences. They are truly creations. The same is true for scientific invention. The man who first made the wheel, the pulley, the steam engine, the aeroplane, went beyond his previous experience. Working on the principle of analogy, he created something in his thought and realized it practically. The same, again, holds good of scientific theory. Chemical elements, the atomic weights of which are known, are arranged in serial order in a table of ascending weight. But there are blanks or gaps in the table; and these gaps are filled in with hypothetical elements which have not yet fallen within the scope of experience. Later on they are discovered. It might be shown how these same processes are involved in philosophical constructions and theological doctrines. But probably sufficient illustration has already been given to convince the reader of the creative power of the mind.

QUANTITATIVE PRINCIPLES

The quantitative principles, on the other hand, express the conditions that determine the occurrence and the amount, or degree, in which any of the six mental processes listed above (p. 24) come to be actually realized. There is, first of all, the principle of mental energy, without which no knowing of any kind whatever would take place. This "mental energy" is regarded as something capable of accounting for mental performance, or doing mental work of various kinds, the amount of which is measured by output. The principle may be stated as follows. The total sum of cognitive output, though limited, tends to be constant in quantity

at any moment for any given mind, no matter how it may vary in quality. According to this principle, the available energy will flow in one or other of the six possible processes, or be distributed among several of them; and, since it is both constant and limited in amount, its usage for the occurrence of any one of them to that extent deflects it from the others. It is interesting to note that this general mental energy which may flow in one or other of the mental processes so as to produce different results brings us back to the Two-Factor theory in that it indicates a general factor with which a specific one must co-operate in order to bring about a result of any kind. To this principle of mental energy is added the principle of retentiveness, necessary to account for the facts of memory and recall, and stated in the terms that any mental process, once it has occurred, tends to occur again more easily. It is in connection with this principle that error may arise, not only in that memory may be untrustworthy, but also because the products of the noegenetic processes may be contaminated by those of retentivity. Third, and running counter to this, there is the principle of fatigue, which militates against recurrence. Fourth, the principle of voluntary control stated in the formula that the intensity of cognition can be controlled by conation (or willing) embodies the fact that those matters to which we attend strike more forcibly upon the mind. And, lastly, to these four principles of knowing must be added a fifth, to the effect that, since the mental processes to which they give rise vary in efficiency from time to time, and from one person to another, they are all overlaid upon a basis of variable individual conditions, derived from such factors as heredity, health, wakefulness, and the like.

Thus, though all people continually tend to apprehend

their own experience, discover relations within it, produce correlated thoughts, recall past events, forget what they once knew, and experience variations in the clearness of their knowledge, they do not perform all these operations equally at the same time; and some persons are more successful than others in these different mental operations. One man may excel in creative thinking, another in power of memory, a third in resistance to fatigue, and yet a fourth in directing and holding his attention steady upon whatever matter he has in hand.

The importance of all this theory, offspring as it is of the mating of introspective observation and mathematical calculation, can hardly be over-estimated. From the merely theoretical point of view, it can offer an explanation of all the mental processes by which we may be said to know things in any way. From the practical standpoint, it can be applied to many uses, and not least to those of educational progress, vocational guidance, industrial efficiency, and even medical diagnosis.

Moreover, the beginning thus made in the sphere of knowing is now being extended, by means of a further development, in "multiple factor analysis", of the original statistical method, to that of character and personality also. If a progress is made in this sphere similar to that which has already been achieved in respect of intelligence during the past thirty years, we may confidently look forward to a vast expansion of our knowledge of human nature and its laws within a reasonable time.

References.

- C. Spearman: *The Abilities of Man*; London, 1927. *The Nature of Intelligence and the Principles of Cognition*; London, 1923. *Creative Mind*; London, 1930.

CHAPTER IV

PSYCHOANALYSIS

As a second instance of an empirical attack upon a group of urgent psychological problems that has led to the construction of far-reaching theory, we may take the work of the Clinical or Medical psychologists, and in particular that of Sigmund Freud. The problem he faced was that of the hysterical and neurotic patient, the man or woman suffering from "nerves". Trained as a specialist in diseases of the brain and nervous system, Freud also practised hypnosis, of which he had made a study under the leading French authorities of the day, Charcot and Bernheim, for the relief of the patients in question. Working with his colleague Breuer, in Vienna, he found that, if he could make his patients recall and discuss their emotional troubles, and trace them back to their origin, while they were in the hypnotic state, relief was obtained. This first empirical observation led to the explanation of the resultant cure as due to a kind of mental "catharsis", or purging. His next discovery was that similar cures could be obtained without recourse to hypnotism, which could not always be successfully induced. It was found to be enough to make the patient relax both physically and mentally, and relate whatever thoughts came unbidden to his mind. Though this proved to be a lengthy process, ultimately these freely wandering thoughts were found to lead to the hidden source in the Unconscious of the emotional disturbance that caused the morbid symptoms.

DREAM ANALYSIS

A third discovery was that of the great importance of dreams as indications of the emotional tensions lying at the root of the neurotic disorders, together with the establishment of the method of dream-analysis, in which the symbolic contents of the dream are made the starting points of trains of unguided thought that in the end reveal the root of the disorder. This gave rise to the theory that the cause of the dream, like that of the neurosis, is always an unconscious wish on the part of the dreamer ; and this theory was further amplified to include the causes of such unintentional events as slips of the tongue or pen, and erroneous though symptomatic actions also, as the effects of thwarted desires and repressed wishes. Accordingly, all such phenomena were held to have their determining causes in the Unconscious, and to be symbols expressing a satisfaction by way of substitute for the gratification of the repressed complexes, while disguising the real wishes whose stark entry into the conscious mind would horrify or shock it.

An "endopsychic censor", or internal repressive force, was further postulated to exclude from consciousness any too realistic an uprush from the underworld of the mind.

It was also observed that the wishes that came to light in the course of the analysis were frequently of a childish character and referred to actual, or imaginary, experiences (or phantasy formations) of the patient's early years, that centred on the emotional relationships of the loves and hatreds of the child for his parents, brothers, sisters, nurses, and the like ; but chiefly for his parents. These old infantile relationships, it seemed, become active again during the analysis ; and, since the original objects of hatred and love are no longer present, the emotional

attitudes are now projected upon the analyst himself. This is the phenomenon known as "transference"; and it only comes to an end when the patient realizes that the present re-living of the old and now forgotten emotional experience refers to the actual or imagined relationships of infancy.

RESISTANCE AND REPRESSION

Three further empirical findings, important for psychoanalytic theory, also emerged from the practice of mental analysis. In probing the depths of the Unconscious extremely great resistance was often encountered. The patient often resisted quite consciously; he did not wish to discuss such matters with the analyst. But more frequently quite unconsciously the repressed material was prevented from reaching expression. The problem accordingly arose: to what was this repression and resistance due? Why do wishes (in Freudian theory mainly of a sexual kind) that are excluded from awareness, fester in the Unconscious, ready to break out in disguised forms, in dreams, nervous disease, and hysterical symptoms? Clearly, because they are dynamic or active. But why were they repressed at all? According to the theory, because they clashed with social customs, conventions, pressures, and rules. The individual cannot give free play to, and freely indulge in, his instinctive, and especially his sexual, desires. Society will not allow of this. Consequently, the wishes must be suppressed; but they none the less remain alive and active, ready to find their outlet in dreams and in other forms of behaviour that have no conscious motives, and, abnormally, in the psychoneuroses.

It should be noted that repression takes two forms, the first being the exclusion from consciousness of material

that never was consciously experienced, and the second the expulsion from consciousness of material which, though consciously experienced, was, and is, strongly disapproved.

The resistances that must be overcome during analysis exist for the same reason as does repression itself—namely, to protect the conscious mind from the contemplation of ideas that would be intolerable to it. None the less, the repressed material finds its expression in symbolic form, as in the dream and the nervous symptom. The neurotic symptom has a definite meaning in every case; like the dream it is a compromise; and it always is a substitute for the satisfaction of the unconscious desire, while at the same time it induces suffering and pain as a self-inflicted punishment for it.

The dream-symbols that stand for the fulfilment of repressed wishes are believed to refer in the main to sexual objects and actions. Though they are usually interpreted in the light of the associated ideas of the dreamer himself, they are not necessarily peculiar to him, but may be borrowed from a common stock. Indeed, later developments of the theory suggest that they may be of phylogenetic or racial origin. For Freud's earlier view that the Unconscious originated in the personal experience of the individual which is now repressed, has been extended to embrace both ante-natal individual and racial experience. We bear within us the living vestiges of the infant, the savage, and the animal, all of which still bear witness to our lowly origins, and still influence our conscious adult life.

STRUCTURE OF THE MIND

The earlier view, too, that the mental make-up consisted of the Conscious, the Fore-conscious, and the Unconscious, has since given place to the new conceptions

of the Ego, the Id, and the Super-Ego, which we may outline as the current psychoanalytic theory of the constitution of the mind; and in this later view all repression with its morbid consequences is explained as being the result of fear. Roughly speaking, the Id (or impersonal "It") is the inherited mass of instinctive tendencies which are neither in harmony with themselves nor with the hard facts of external reality. This Id includes in itself the instinctive driving forces that reveal themselves to consciousness as wishes or desires; and when these desires are repressed by the Ego, acting unconsciously, they return once more to the depths of the Id. The Id is actuated and ruled by one principle only: it strives blindly towards securing pleasure. Whereas the Ego, acted upon by, and reacting to, the external world, strives to conform itself to the necessities of the reality with which it is in contact. It perceives the real world and has to deal with it in order to live. The Ego develops out of the Id; and, so far as it is unconscious, it is part of the Id. It is that part of human personality which, when properly developed, modifies the crude workings of the instincts and, by a process of selection and control, brings them into harmony with each other and with itself.

The Super-Ego is a mental formation, peculiar to human beings, which is more or less equivalent to conscience; for it is the Ego-ideal which is postulated to account for the feelings of guilt we all, and especially some neurotics, experience. This Super-Ego is derived from the inner conflicts of the Id, and it is partly inherited, though mostly developed in the individual child as a fear-reaction against his own infantile tendencies whose expression drew down upon him disapproval, punishment, and pain.

The older belief that conscience and the sense of guilt are derived from external training, punishments, and threats, is now replaced by one that makes their roots lie in the destructive and hostile impulses that are the child's own natural reaction to the thwarting of its instinctive impulses and desires. Such hostility, fear, and rage, due to the disappointment of baulked instincts, are terrible to contemplate; they lead to unbearable conflict, and are repressed and "dissociated", or broken away, from the Ego. They cease to be in contact with reality, remain in an infantile stage of development, and are not modified by new experiences as the Ego continually is. None the less they are manifested in consciousness in the form of fear, remorse, and guilt.

INFANTILE EXPERIENCE

Put in this abstract way the foregoing theory may seem to lack convincingness. Let us therefore try to reconstruct the earliest emotional experiences of the new-born and very young child. Adults have no way of knowing precisely what these emotional experiences are. They have long since forgotten them. But from the infant's behaviour in fear, rage, and love situations we may believe that they are extraordinarily potent, amounting to what, in us adults, might be unreasoning, panic terror; the desire to crush, maim, rend, and devour; or to possess utterly. When such emotions mix together and become pitted against each other, we can easily appreciate what a tremendous and intolerable conflict ensues, and how absolutely necessary it is that it should be got rid of somehow.

Consider how the child is born into a world of real objects that it does not yet know, with which it must gradually acquire an acquaintance, to which it must

adjust itself. But it comes into the world with certain biological needs that must be satisfied if it is to live. Nature has already provided means by which these vital needs can be satisfied. Some are physiological needs, like breathing, the circulation of the blood, and excretion. Others are psycho-physical or instinctive needs, like those that are satisfied by sucking, grasping, and carrying to the mouth. In the use of these means not only does the baby begin to be aware of objects; he also experiences satisfaction and pleasure. He comes to know his mother as the source of food; he also likes the pleasure of feeding and the cessation of hunger. At this stage his mouth is the greatest focus of interest, the breast his earliest love-object and the source of his greatest satisfaction. If thwarted here, hostility and hate may become tangled up with his love. The impulse to suck may become a blind impulse to bite, to injure, to destroy; and a deadly conflict may thus be set up, which must be expelled from consciousness.

A later stage of development gives rise to an interest of another kind, to the adult mind disgusting, but to small children manifestly a source of great pleasure, in connection with the excretory functions. We may ask why, if these processes of nature give pleasure to the child, they are regarded with such shame and disgust by grown-up people. The answer is that some of the very early interferences, prohibitions, restrictions, and frustrations occurred precisely on their account. Training in cleanliness and nursery teaching played their part; and the interesting and desired activities came to be regarded with aversion. Like the conflict centring on the mouth-pleasures, these conflicts connected with anal-pleasures were accordingly repressed also. The learning of self-control in respect of the sphincter muscles of the bladder

and anus gives the infant a sense of power ; and the kind of training it receives—by punishment and fear, or by encouragement and help—largely determines the effect upon his character in after life. It is naughty to be dirty, good to keep clean. If this standard is accepted, and the sphincter pleasures are given up willingly and without protest, there need be no conflict ; but if it is accepted only under the duress of punishment and fear, a clash arises. The child feels guilty if he is naughty, yet his instincts contradict the standard ; and his defeat by external reality in the shape of his mother or nurse will tend to be made up for by exaggerated phantasies of his own power. In this phase of child development, while he is beginning to realize in his infantile experience the meaning of naughty and good, and reaping praise or blame, the Super-Ego develops, and an elementary code of morals begins to evolve as an internal court of right and wrong. Here again emotional conflict may arise between the instinctive pleasure impulses and conscience itself, which may be so intolerable as to require further repression.

Some psychoanalysts trace the origin of the Super-Ego farther back to the earlier phase of mouth interest, when the self-assertive and fighting instincts of the baby towards its love-object, aroused by its very helplessness and deprivation, are thrust back upon itself. The infantile attitude is one of rending, tearing, eating the parent who deprives him of the pleasure of hunger-satisfaction. In turn, in the child's immature mind, the parent must be presumed to take the same hostile attitude towards him ; and the Super-Ego, representing the parent, becomes intensely aggressive, unimaginably cruel, towards the child. Terrific anxiety is set up, and the aggressive instincts are further called into play in self-

defence against the presumed parental hostility. Anxiety increases only in a vicious circle, so that the Super-Ego becomes unbelievably monstrous.

THE ŒDIPUS COMPLEX

These two accounts of the origin of conscience have tended to supplant the earlier view that made it arise in connection with the Œdipus situation,¹ as the result of more obviously sexual relationships. The Œdipus situation is regarded as the third phase of the sexual development of the child, during which preoccupation, interest, and pleasure shift from the mouth region and excretory organs to the organs of generation and the activities connected therewith. The child becomes very interested in the problem of birth, and frequently asks for explanations of it. Not seldom false explanations, or none at all, are given, and the child invents explanations of its own. It may even go back to its own experience of the previous stages of mouth-interest and

¹ This is the situation which may give rise to the so-called Œdipus Complex which Dr. Ernest Jones defines as "the (usually unconscious) desire of a son to kill his father and possess his mother". The term is taken from the story of Œdipus as related by Sophocles. Œdipus (the "swollen-footed") was the son of the King of Thebes, who was exposed by his father with a spike driven through his feet, because an oracle had prophesied that he would kill his father and marry his own mother. He was saved by a neighbouring King, and reared in ignorance of who he was and what had been prophesied of him. Another oracle, however, revealed to him that he would slay his father and marry his mother. To escape this double crime of parricide and incest, he avoided his adopted home, wandered abroad, and, meeting with his true father, quarrelled with him and slew him. He finally reached Thebes in his wandering, read the riddle of the Sphynx, so freeing the city from a raging plague. He was proclaimed King, and given the widowed Queen in marriage. They had four children before he discovered the truth. Thereupon he put out his own eyes, and lived afterwards in constant misfortune.

excretion-interest for its explanations. In any case, it realizes that the parents have knowledge and experience which are withheld from it; and this gives rise to disappointment and jealousy. The child neither knows, nor shares, with the parents. It wishes, accordingly, to deprive them of what they have in common, while it is excluded; and, however fantastically this may be conceived by the infantile mind, it desires that, whatever it may be, it should do harm to the parents. But an unescapable fate overtakes these hostile wishes, and they rebound upon the child himself. The parents must be animated by a similar hostility, and will actually do to it what it wishes should be done to them. Accordingly, the sexual phantasies of the child are terrifying in the extreme, giving rise even to the "castration complex" of actual physical mutilation. During this Œdipus phase also the love energy, hitherto directed upon himself, becomes turned outwards to fix itself upon an external object. For the boy child this is the mother, whom he loves and desires for himself alone.¹ Because of this he assumes an unconscious attitude of jealousy and hatred towards the father, who is his rival for the mother's love; and the whole tangle of infantile emotional hostilities then centres against the father. If the child is able to resolve the conflict by coming to regard the father as an ideal, his hostility will grow less and give place to a normal attitude. His sexual desire for the mother will also become a more natural form of affection, instead of remaining a sexual one. But if the conflict is not properly dealt with, and the child still remains over-attached to the mother and hostile to the father, the result will appear in consequent character defects, or even in neurosis, in later life.

¹ For the girl, *mutatis mutandis*, the situation is similar.

UNCONSCIOUS MOTIVATION

It will be seen that the chief emphasis in this psychology is on unconscious motivation coming from the region of instinctive demands for the satisfaction of needs that are biologically useful to the individual and to the continuance of the race. The instincts provide the mainsprings and urges of life ; and, though Freud largely, though not entirely, identifies them with sex, in this he agrees with the Hormic psychologists,¹ except in so far as the latter insist upon the rôle of purpose in human behaviour, and assert finalism rather than absolute determinism, as Freud does, in psychology.

None the less very notable advances have been made in our knowledge of human character and its development by this clinical or medical approach. The empirical basis upon which the theory is grounded has been most carefully investigated ; and the extension of theory from the pathological to the normal appears to be largely justified. We come to regard the normal individual as a creature of dynamic instincts that strive for expression, and yet are capable of being deflected from their natural goals by a variety of circumstances, among which must be counted the lack of intelligent control during the period of infantile development, when the emotional life far outstrips the life of the intelligence. That this is so is seen in the method underlying the cure of the neurotic. The older technique of " catharsis " implied the working off of infantile emotion in the light of adult experience. The later " transference " means the re-activation of the infantile emotional attitudes that are directed now upon the analyst, and their dissolution by a proper understanding of their true nature and factual origin.

¹ Cf. Chapter VI.

We may now partially complete this picture of the normal human adult as a creature of obscure biological drives, by adding the trait of intelligence (dealt with in the previous chapter), as an instrument or tool which is at his service for the discovery of means by which he may secure his natural and ideal goals. And this rough outline picture will be redrawn and retouched when we come to a consideration of the Hormic, or Purposivist, Psychology.¹

¹ Cf. p. 60 *sqq.*

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CHAPTER V

GESTALT AND ORGANISMAL PSYCHOLOGY

AN important and much-discussed trend of present-day psychology is that commonly known by the German word "Gestalt", variously translated as Configurationism, Formalism, or the Psychology of Shape. With it Organismal Psychology is so closely allied that both will be treated together in the same chapter. Based upon empirical observation, mainly in the sphere of sense perception, a highly theoretical system of psychology has been developed, in which physiological hypotheses concerning nerve action play a very large part.

Towards the end of the last century, in criticism of the teaching of the Associationists,¹ who reduced mind to sensations, the view was advanced that there is something more in any perceived whole than the sense elements which enter into it. A striking instance given in support of this view by Ehrenfels was that of musical melodies, which remain absolutely the same throughout, although, when transposed into another key, every single note in them has been altered. Clearly, then, the melody cannot be merely the sum of the individual elementary notes. Ehrenfels agreed with the Associationists that our perceptions are based in the last analysis upon elementary sensations, and that these sensations, no matter how they may become grouped or associated, always remain identical with

¹ Cf. p. 13.

themselves and correspond point by point with the sensory stimuli that cause them. But, to account for this "something more" that is found in our perceptions, he postulated an intellectual faculty over and above, and higher than the senses, which unites the sensations together and gives them what he called a "form-quality". According to this view, then, in perceiving we proceed by way of two consecutive steps; first we sense, and then we relate our sensations so as to constitute perceived "wholes".

PERCEPTION AND BRAIN

This original notion of form-qualities over and above sensations was radically altered by a group of psychologists, of whom Max Wertheimer, Kurt Koffka, and Wolfgang Köhler are the most prominent representatives. Instead of holding that our perceptions are formed by an intellectual power which works upon our sensations, the view was now advanced that these perceptions are simply the results of complicated processes that take place in the nervous system. This Gestalt psychology radically rests upon a physiological hypothesis. Wertheimer suggested that every sensory stimulus sets up a field-action in the brain, and that there is an overlapping, or short-circuiting, between the fields of nervous force. The perception is held to be the mental parallel of this active brain state. The hypothesis was first advanced in explanation of the apparent movement of stationary objects, upon which Wertheimer had for some time been experimenting. He had observed that, if two neighbouring areas of the retina of the eye are stimulated one after the other by light, with a favourable interval of time between the stimulations, we do not see two separate lights, but only

an apparent movement of a single light. The phenomenon is familiar enough in the cinema, and can be observed as an upward or downward movement (with change of colour) when road-traffic signals alter. A later and more interesting observation still is that if the first stimulus is weak and the second strong, the apparent movement is from the place of the second to that of the first, though subsequently it appears to swing back again. This suggested a kind of nervous discharge from a higher to a lower potential, and thus appeared to support the hypothesis. When the stimulations are simultaneous we do not see movement, but stationary objects. Up to this point, elementary sensations were still admitted as the raw material out of which perceptions are built up; but the notion was now added that fields of force set up by the sensory nervous currents relate these sensations together into a synthetic whole in some other than a merely summative way. They are not simply added to one another. A similar hypothesis in which factors of central nervous origin were held to accrue to the elementary sensations was also advanced by Koffka. Except that the notion of "form-qualities", dependent on higher mental process, is now translated into physiological terms, both these views seem to agree well enough with the older doctrine of Ehrenfels.

UNITARY WHOLES

But later development of the hypothesis altogether removed from it the idea of any synthesis or mere putting together of sensory elements into perceptions. These latter, it was observed, are never apprehended as sums of elements, but always as unitary wholes. They correspond to the actual objects of which they are the perceptions, and also to the total brain state at the moment, which

accounts for their being experienced as wholes. An "isomorphism", or agreement, is postulated between the perception and the brain state; and the typical brain process corresponding with perception is said to be a total process characterized by its wholeness. This hypothesis, already somewhat complicated, is taken a step further by Köhler's doctrine of "natural units", according to which point by point excitation of individual nerve endings, isolated conduction of nervous impulses to the brain, and separate excitement of different cells of the cortex, could never correspond either with the unitary objects of physical Nature or with the mentally perceived wholes for which an explanation is required.

PRINCIPLES OF GESTALT

To meet this difficulty, certain principles, derived from a consideration of the way in which isolated lines, dots, and the like, are grouped together in perception, are applied in explanation of solid figures (or objects) which stand out as "things" against a background. This is looked upon as an extreme case of "grouping", and referred to the same laws. Among such laws are those of "nearness", "closure", and "qualitative similarity"; which may be illustrated as follows. If three pairs of similar parallel lines are drawn fairly close together, with wider intervals between them, the neighbouring pairs will appear as separately grouped units. (Fig. 1.) Draw



FIG. 1.

now a third parallel line within each pair, and the unitary groups will be even more characteristic. (Fig. 2.)



FIG. 2.

Add further intermediary lines; and at last, as an extreme case, solid figures will be perceived, standing out, as did the grouped lines, upon an indifferent background. (Figs. 3 and 4.) This is the phenom-



FIG. 3.



FIG. 4.

enon of "figure and ground"; and a physiological explanation of it is given on the line of differences of potential between those areas of the nervous system that are respectively functioning as "figure" and as "ground".

The principle of "closure", together with that of "nearness" and "similarity", already operating in the case of the neighbouring lines, is brought out even more

clearly by another example. If, instead of multiplying lines within the pairs of parallels, we add short lines projecting outwards at right angles from the ends of the pairs of neighbouring lines already drawn, instead of a grouping together of the closer lines we now perceive the more widely separated ones as groups. (Fig. 5.)

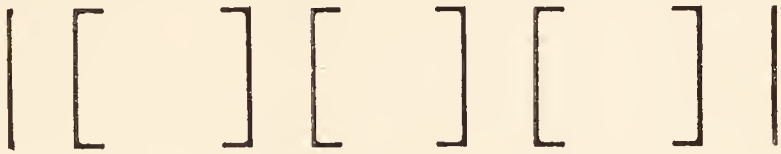


FIG. 5.

As so far outlined, the Gestalt hypothesis has had to do with the perception of groups and of wholes only; but an attempt was soon made to apply the laws of wholeness, closure, etc., in explanation of other mental process also. Thus comparison, for example, is interpreted as being a matter of insight, or the grasp of one detail of a whole in relation to the rest. This interpretation is illustrated by the results of numerous experiments carried out with animals—fishes, birds, rats, monkeys, and the like. A typical experiment consists in training the animal always to seek its food from the more brightly illuminated of two food-boxes. After training, the relative brightnesses are increased, so that what was formerly the dimmer is now as bright as the previously brighter box. In these circumstances the animal does not continue to go to the customary box for its food. It goes to what is now the brighter of the two, thus showing by its behaviour that it is reacting to a detail in relation to the whole situation. Comparison for the animal accordingly seems to be a relational way of perceiving; as indeed it is for man. But the ensuing behaviour of seeking the food in the brighter box is a reaction to a “closed” situation, in which both brighter and dimmer play their parts.

EXPERIMENTS WITH APES

The same relational manner of perceiving is even more strikingly illustrated by the behaviour of the untrained anthropoid apes studied by Köhler. These animals were confronted with a number of simple problem situations in which they had to overcome obstacles placed in the way of obtaining food. For example, a banana would be laid outside the cage containing the animal, in sight of the ape, but too far away from the bars for the creature to grasp it. A stick lying within the cage, and in view of the ape when it was looking at the banana, is apparently seen as a means towards the end of securing the fruit, for it is at once seized and used to draw the objective into the cage. The feat is more difficult of achievement when banana and stick are not seen at the same time, as when the stick is behind the animal, at the back of the cage. As a rule it is only after some practice in the manipulation of sticks to drag food into the cage that the ape comes to make use of sticks placed in such a position. The inference is that, in the first case, the principle of closure operates easily. The perceptual gap between fruit and stick is not a great one; and insight comes at once. The stick is seen determinately in relation to the whole situation, including the fruit. Whereas in the second case closure comes about with difficulty, since stick and fruit are not grasped in one and the same visual field. Another feat that proved even more difficult was the breaking off of a branch from a tree that stood in the cage, and using it as an instrument for securing the food. In explanation of this difficulty it is argued that the tree forms a very firmly established (closed) "whole" for the ape, and could not easily be perceptually broken up so that a part of it (the branch) could enter into another closed "whole"

together with the fruit. The most striking of these performances was that in which one of the apes fitted together two (and later three) bamboo canes, each by itself too short to reach the fruit, thus constructing a long pole by which the banana could be reached. This happened on the first occasion by sheer accident. Having tried both the short canes in vain, the ape was idly playing with them while looking at the fruit, and the end of one of them chanced to become stuck in the hollow butt of the other. At once the animal made use of his invention and drew the fruit into the cage with it, apparently perceiving with insight that the lengthened stick was appropriate for his purpose. Moreover, on subsequent occasions he fitted the canes together with evident intention. The chance discovery just related was not a solution with insight of the problem until after it had occurred; but what, even if not so dramatically striking, is an indication of the operation of the principle of closure and the arising of insight, is a performance that happened before this. The ape had pushed one stick in line with another out towards the fruit, evidently fitting the two sticks together with the banana into one perceptual "whole". The problem would in fact have been solved by this achievement, provided only that the sticks had stuck together. In principle the solution was there. The reader interested should consult Köhler's *Mentality of Apes* for further evidence of their insight and its limitations.

PERCEPTION, THOUGHT AND BEHAVIOUR

Since this principle of closure, originally generalized from group wholes, is applied in explanation, not only of perceived solid figures and objects and the behaviour of animals, but also of the higher thought

processes and acts of will, it is regarded as of prime importance by the Gestalt psychologists ; and the attempt has been made to show how it also may be accounted for on physiological grounds. For example, the figure-ground phenomenon is said to be due to differences of electrical potential set up in the sensory surface (*e.g.*, the retina) that propagate themselves to the brain. Thought is explained as being due to a disturbance of equilibrium of potential set up in the nervous system. It is initiated by an event the mental parallel of which is a question asked or a problem set. And the subsequent restoration of equilibrium through a transitional phase that is marked by a temporal "closure", comes to an end when the answer is found or the problem solved. Both instinctive and volitional activities are dealt with in the same fashion. Thus animal behaviour and human conduct are brought under the heading of configured or shaped wholes, and within the scope of the regulative principles derived from a study of perception. Just as a functional whole in the nervous system corresponds to the seeing of an object, or pattern, on a background, so behaviour is the reaction of the organism as a whole to the entire stimulus-situation. In this view the organism is regarded as being a field of nervous energy which reacts to stimulation by changing its nervous potentials, and in regaining its balance it both perceives and behaves. The aspect of perceiving is linked up with that of behaving as two sides of one and the same neuro-muscular response to disturbance of potentials.

Consider as an example the behaviour that leads to the fulfilment of any conscious wish we ourselves may experience, such as the desire for food when we are hungry. Already in such a situation a goal is set up—the satisfying of the hunger, or the restoration of equilibrium in a

neuro-muscular system that has been disturbed by internal stimulation arising from the stomach wall. The organism is under tension or stress towards that goal ; and the movements ending in restoration are those of seeking food. They are the phases, through which we must successively pass, of a process that begins in desire and ends in satiety, or, stated physiologically, that begins in a disturbance of nervous potential and ends in equilibrium. It is a case of "closure" in a temporal rather than a spatial system. The hungry animal is, as Koffka says, forwardly directed ; and its restlessness ceases only when the goal is objectively attained.

PHYSICS, BIOLOGY, AND PSYCHOLOGY

The foregoing very brief and general sketch of some of the outstanding points of Gestalt theory that have been developed in a large and growing literature of the subject leads one to the view that the living and conscious organism is a unitary whole, all the properties and reactions of which follow what are in principle physical laws. Indeed, Köhler begins his psychology "from the starting point of physics", showing that there are systems of distribution of physical energy, such as those of heat or electricity, the nature and behaviour of the parts of which do not belong to them as parts, but are derived from the whole system. Thus an electric charge derives its potential from an electrical system or field in which there are necessarily other potentials. This is fundamentally a Gestalt view. And it obtains no less clearly in general biology, especially in the phenomena of growth, where the multiplication and differentiation of individual cells, tissues, and organs come about in virtue of the physiological gradients that in no way belong to the parts but

only to the organism as a whole.¹ Mutilations also at certain early stages of the developing embryo are made good in such a way that in the end the normal form of the organism emerges from the cells that have been left intact. Facts of this kind are advanced against any mechanical conception of growth, since the multiplying and differentiating cells are apparently able to adapt themselves to the most unusual circumstances. But a vitalistic conception of these phenomena is equally unacceptable. The Gestalt notion of the spontaneous regulation of dynamic systems, as exemplified in physics, is accordingly applied here. The organism, which is regarded as a distributed system of energy existing within wider fields of force of various kinds, regulates its own activities of itself in virtue of being a whole, the while fatally responding to the whole environment of which it is at the same time a part.

¹ A "gradient", in general, is any measurable quantity that changes regularly in amount from a higher to a lower point. Thus there is a gradient of pressure, for example, such as that of the air which varies from, say, the top of a high mountain to the sea level, as can be shown by the use of a barometer; or a gradient of heat that runs from the source of the heat to the distant point to which it radiates. A physiological gradient is instanced by the difference in the rate of living at the surface and in the interior of a single-celled organism. The highest rate of life is at the surface, and the lowest inside. In many-celled animals there are other gradients, such as that which runs from head to tail, where the highest rate of living is at the head end, the lowest at the tail end. It is because of such gradients that the development, growth, and activities of the parts of living organisms are directed. Indeed, if parts of a developing organism are removed early enough, before they have become too far differentiated, and are transplanted from that point in a gradient that they formerly occupied to some other point, curious results will follow. What in the ordinary event would have grown into a head will become a tail, and what would have become a tail will grow into a head.

GROWTH ILLUSTRATED BY GRAVITY

This view of organic growth may be put in another way. The beginning, the end, and the intermediary phases of any process may be looked upon as a temporal Gestalt, or whole, no part of which has any process-character of itself alone. R. H. Wheeler illustrates this,¹ as a preliminary to the consideration of growth, by reference to a falling apple. The apple hangs upon a twig, balanced against the sum of forces of the system of gravity in which it exists by its connecting stem. The stem breaks, and the apple falls towards a point already determined by the whole system. The goal is there, and must be there, as well as the direction of the fall, before the fall begins, just as the second stimulus must be applied, in Wertheimer's experiment, before "movement" can be seen. "The system of gravity", Wheeler writes, "furnishes the stress under which the apple hangs on the tree; it gives to the apple its possibility of motion. At the same time it gives to the apple the remote end of its fall and the direction of its fall. The system contains the apple's past and its future; and both, simultaneously, are conditions of the present, the momentary behaviour of the apple. The fall, as a given continuum, can be accounted for only by going outside that continuum to the system of conditions that sustain it." Notice here in passing the use of the term continuum, as whole. Apply this by analogy to the growth-process. A growth potential is set up and maintained by the fields of force of which the growing organism is a highly differentiated and relatively, but only relatively, separate part. The direction of growth depends upon the physiological gradients proper to the organism as a

¹ Cf. *The Laws of Human Nature*; London, 1931.

whole ; and these gradients are activated by the release of a potential. Its remote end is increase and specialization of structure, together with function, up to the limit set by the capacity of the gradients to react to the surrounding fields of force.

GROWTH AND BEHAVIOUR

This interpretation of the phenomena of growth links it up with behaviour, in the sense that the maturing of structure, and particularly of the nervous and muscular structure, is accompanied by ever finer and finer differentiation of function. Behaviour develops and becomes more detailed and specialized in proportion as the neuromuscular system attains greater specialization. This has been observed in the study of embryos, in which increasingly finer movements are to be seen succeeding mass-movements in proportion as specialized nerve centres and structures develop from the originally unspecialized mass of nerves. Thus, before the nerves that will supply the muscles of the limbs grow out from the centre, the limbs move only as appendages of the body, as Coghill has observed in the embryos of salamanders.¹ Later, when supplied with nerves, these parts can move separately. This is true also of the creature's head, jaws, and gullet muscles ; and the animal can be seen to react, with ever finer and finer differentiation of behaviour, to food-objects that come to stand out from the general surroundings as significant "things". Behaviour thus comes to be included under the heading of growth ; and the distinction of instinctive from learned behaviour patterns disappears. For all behaviour becomes a function of the degree of maturity that the organism has reached. Some

¹ Cf. G. E. Coghill, *Anatomy and the Problem of Behaviour* ; Cambridge, 1929.

animals, insects, domestic fowls, and the like, are born in a practically mature state ; others mature after birth. The former, we say, act instinctively, while the latter learn by exercise and experience ; but experiments have shown that animals prevented from experiencing and exercising for some considerable time have in the interval so matured that they are not at a disadvantage in respect of those whose " learning " has been normal.

LEARNING AND GROWTH

What, then, is learning ? Whether in bodily skills or in mental attainments, learning is the perfecting of response on the part of the organism to stimulation coming from the environment. It does not come about by repetition ; since merely to repeat in a stereotyped way is not to learn, but to stand still in achievement and to make no progress. While learning continues, each time it is performed the skilled action becomes easier to carry out, the knowledge increases. But nothing happens between the exercises, save perhaps what the older psychologists called " consolidation " or the " deepening of traces " in the brain ; and no previous exercise of itself can explain progress made in a subsequent one. If we could interpret the facts in terms of growth, most of the difficulties found in the older theories of learning would be avoided.

What, then, is growth ? Apart from mere increase in bulk, growth is differentiation, specialization, organization. In these senses the organism is growing while it learns. Each time a learning situation is set up, differentials of potential are established in the nervous structures ; and the learner is under stress towards a goal of skill or of knowledge that can be attained only by finer

differentiation of structure. There is a close analogy between this state of affairs and that in which, as we have seen, growth takes place. And so close is this analogy that the growth-potential has been suggested by Wheeler as the true explanation of the acquisition of skill and knowledge.

MEMORY

There is a further application of Gestalt theory, closely connected with what has just been said, that should not be omitted even in this brief account of it. Experiments on memory, in the shape of recalling and reproducing line drawings, have shown that two main tendencies obtain in reproduction. We tend to make any outstanding or significant features more precise, on the one hand, and to smooth the whole drawing out to a more balanced (or "levelled") shape, on the other. Though opposed, both these tendencies have the effect of securing as "good" a shape (Gestalt) as possible. What light may these facts throw upon memory, in its three aspects of retention, recall, and recognition? We cannot, obviously, remember what we have never experienced; but when we are neither experiencing nor remembering there is no reason to suppose "traces" or "pathways" that have been formed remaining somehow inactive in the brain. In this sense there is no retention. Nothing happens between experience and recall. Nor is there recall in the usual meaning of the word. Nothing is "called back". What happens when we remember is that, under actual stimulation now, a pattern of nervous potentials, similar to that which was produced by the original experience, is set up. The actual stimulation now may be only a part of the original and yet be enough. Recall thus turns out to be re-cognition, knowing again

what was perceived before, though possibly in a weaker and less clearly defined way, because of the incomplete nature of the present stimulus.

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CHAPTER VI

HORMIC PSYCHOLOGY OR PURPOSIVISM

ANOTHER very important line of approach towards a solution of the problems of psychology at the present time is that which has been followed up by way of the instincts. Since the time of Darwin, and the general acceptance of the theory of evolution, a great deal of progress has been made in the branches of comparative psychology that respectively deal with the animal kingdom, primitive peoples, and the period of childhood. The observation of the behaviour of animals other than man, both in field work and in experimental conditions, the researches of the anthropologists, and the exhaustive studies that have been made of the developing minds and expanding behaviour of children from birth onwards, have thrown very considerable light upon the motives and springs of human action. It has come to be realized that the driving force of human conduct, which, distinguishing it from the behaviour of lower forms of life, was formerly supposed to be Reason in pursuit of the Good (variously conceived as happiness, pleasure, tranquillity, and the like), is in fact strictly akin to that of those lowlier brute creatures from which man originally had his rise. And it has been realized also that the "blind instincts" of the brutes are not really blind at all, but that at every ascending step of the ladder of evolution some degree of intelligence, no matter how rudimentary, directs the

powers by means of which the animal carries out its actions towards goals that are set for it by Nature. This realization has been strengthened by inferences drawn with regard to the unfolding mentality of infancy and childhood, and particularly from the evidence of increase in the co-ordination of ideas and movements, the acquisition of language, childish play, and the like, all of which seem to point in the direction of a possible theory of recapitulation of evolutionary phases in mental development not unlike that which has been put forward in respect of the development of bodily organs by embryologists. And, though here, as elsewhere, there are breaks and gaps in the evidence from anthropology, as indeed we should expect in the light of current views upon the manner in which evolutionary changes take place, such knowledge as we have of the habits, usages, and customs of primitive and undeveloped peoples points to a greater weight of instinct over intelligence in them, so far as motives for action are concerned, when compared with the higher cultures of to-day.

This line of approach, especially as based on the study of animal behaviour, is followed by the so-called Hormic or purposive psychologies—the psychologies, namely, that make behaviour and conduct issue from the internal impulses, drives, and urges that are unloosed in the animal and in man by appropriate stimulation coming from their surroundings. It is the aim of these psychologies to show how the most complicated and highly developed human activities of a social, moral, political, and even of a religious kind, may be traced back to their origins in lowly forms of animal endeavour. The theory of evolution is thus applied to throw light upon the mental, in the same way as it throws light upon the physical, aspects and processes of living beings; and a

search is made for principles of explanation by which an account can be given of the observable facts.

MARKS OF BEHAVIOUR.

Now, a survey of all the available facts of behaviour in different animal forms seems to indicate a number of such principles. In the first place, all "behaviour" has certain marks by which it can always be recognised and distinguished from mere mechanical action. William McDougall,¹ who is one of the most outstanding of the Hormic psychologists, indicates a number of such characteristic marks. As contrasted with mechanical movement, every form of behaviour shows a spontaneous and continuous striving towards a goal, which as a rule ends only when that goal is reached. Again, the bodily movements in which behaviour consists are not rigidly fixed and stereotyped, but are indefinitely variable. Further, though some of its parts may be more prominently involved than others in the activity, it is always the animal as a whole that behaves. And, finally, the repetition of a behaviour response to a given situation shows some degree of improved efficiency in dealing with that situation. Though these characteristic marks are to be found in all behaviour, they are not all, however, to be found present to the same extent. There is more or less persistence, more or less variation, more or less improvement. And in those cases where persistence is great, and variability and improvement small, as is the case in most of the behaviour of the insect world, we have the typical marks of that kind of behaviour which is usually called "instinctive"; though these marks of themselves alone do not serve to define the term instinct. What is most noteworthy in all this is the end-seeking aspect of animal

¹ Cf. *An Introduction to Social Psychology*; London, 1936.

behaviour, which essentially consists in a striving towards goals, together with adaptability, variation, and improvement in dealing with the means of attaining those goals. This means purpose.

PURPOSE

But are we to suppose that all behaviour, even in the lowliest animal organisms, involves purpose? The answer will depend upon whether or no we limit the meaning of this word to the kind of purpose we ourselves experience when we deliberately aim at a goal, and set about planning means by which we may reach it; and there seems to be no good reason why we should make such a limitation. For, in the first place, neither having a goal clearly in mind nor planning to attain it will provide the driving force that is necessary to spur us on to action; and, in the second place, we ourselves often perform what we would admit to be voluntary or purposive actions because of an inner urge, or impulse, towards a goal that is very obscurely in mind, and by way of means we have not carefully thought out. Rather than deny, with Descartes,¹ any sort of mentality to the lower animals, it would seem to be wiser to acknowledge our evolutionary kinship with them all, and to admit, not only urges and impulses in them towards securing ends, such as the necessities of life and the continuance of their species, that are essentially like those we ourselves experience, but also, each according to its degree and kind, powers of apprehending and of anticipating, even if of the most rudimentary sort, to bring the instincts of these creatures into action, and to guide them towards the goals at which they aim.

¹ Cf. p. II.

INSTINCTS

How, then, are we to conceive of what these ultimate driving forces of animal behaviour and human conduct may be? We cannot do better than accept McDougall's definition of an instinct. It is "an inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action." As a concept put forward in explanation of these inborn tendencies to certain types of behaviour, an instinct has thus two aspects. There are the inherited nerve-muscle mechanisms that execute movements, and are ready to function upon appropriate stimulation according to a definite pattern. This pattern, as we have however seen, is not necessarily fixed and rigid, but is capable of alteration in several ways. If the total mechanism is taken to consist of four parts, the receiving organ of sense with its incoming nerve connections running up to the brain centre; the brain with (where it exists) its cortex; the nerve linkages between the brain centre and the internal body organs, including the ductless glands; and the outgoing nerves running from the centre to the muscles involved in observable behaviour; we can distinguish in the mental aspect as parallel parts, or phases, the perception of the object that acts as suitable stimulus, the emotional excitement connected with it, and the action, or tendency to action, in some kind of withdrawal from, or manipulation of it. Perception corresponds with the incoming nervous impulses from receptor to centre, emotion with outgoing and incoming impulses to and from the internal organs, and

conation (doing or striving) with outgoing impulses to the effector muscles. It is in the first and last parts of this mechanism that modification is possible. The receptor organs innately adapted to react to stimuli and stimulus-objects of a particular kind only often come to react to other kinds of objects with which the original ones have become associated; and they often cease to react to those which originally called out a reaction. Thus, the instinctive flight reaction, shown by many animals and by human infants by shrinking or cowering when stimulated by a loud noise, may become attached to some heretofore indifferent object. The reader is referred to Chapter VII for an account of experiments in which the fear-reactions of very young children have been investigated, the conclusions of which indicate that congenital behaviour patterns may come to be elicited by many other than their original stimulus-objects, so that these come to function as substitutes for the originals. These substitutions may come about in two different ways, which still further modifies purely instinctive behaviour, linking it up with a further range of stimulus-objects. They may be established either by "contiguous association", when the original and the substituted stimulus are experienced together; or by a similarity between the original and the substitute, as when, by reason of its likeness to it, the substitute replaces the original. These two mechanisms of "association by contiguity" and "association by similarity" enormously extend the possible number of objects by which the instincts may be aroused, especially in the higher animals and in man; and, when one takes the number of the instincts themselves into account, the range of instinctive behaviour is seen to be still further increased.

NUMBER OF INSTINCTS

How many are there of these native, inborn dispositions that can be distinguished one from another? McDougall in his *Outline of Psychology* lists in all thirteen major instincts, as well as several minor ones, that lie at the basis of the behaviour of mammals and provide the mainsprings of all human conduct also. They are to be distinguished chiefly (where this is experienced) by the typical primary emotions that accompany their activities, and by the kind of goal secured, or aimed at, by the behaviour that issues from each one of them. Thus we can easily distinguish in our own case the emotional experiences peculiar to the major instincts of flight, sex, or parental protectiveness; and we can as easily understand the fundamental differences in the goals at which they are respectively aimed (in these cases self-protection and racial continuation). That other animals also are natively and biologically directed towards similar goals is indicated by the fact that they attain such goals by striving; and in very many cases it seems legitimate to infer emotional states comparable to our own from their behaviour. Especially is this true in the case of the instinct of pugnacity with its primary emotion of anger, which differs from all the others, except curiosity, in that it is not called into action by any one specific object or range of objects, but rather is brought into play by the thwarting of any instinctive activity. Even the instinct of flight, if thwarted in its aim, may provoke pugnacity and anger; and the cornered and terrified animal may turn upon its pursuer.

VARIABILITY OF BEHAVIOUR

Besides the extension, already considered, of the range of instinctive activity to objects with which originally

it was not connected, the nerves and organs of movement by which instinctive goals are pursued and reached must also be taken into account. And here there is great variability at different levels of the animal kingdom. Behaviour is limited, and often appears to be very stereotyped—as in the insect world, for example—not only because it is greatly specialized on the receptive side of the instinct, but also because these nerve-muscle mechanisms are relatively poor and inflexible, in comparison with those of the vertebrates, and especially those of man. Moreover, the insect is hatched from the grub in a practically matured condition, so that further maturation can bring about little if any further flexibility of behaviour. In man, on the other hand, few instincts are matured at first; while most come to maturity later on under the influence of the general innate tendencies of sympathy, imitation, play, and suggestibility, all of which tend to modify the original instinctive reaction patterns. Added to this, intelligence plays its part very soon in the life of the human infant in controlling the exceedingly plastic patterns of the behaviour by means of which the instinctive goals, and those deriving from them, may be secured. Because of these influences, and also because of the plasticity of the neuro-muscular executive mechanisms in the human being, the radically instinctive character of most human conduct is hidden and obscured; for the variety of ways in which man is able to secure his goals is indeterminate, and his action is accordingly to a large extent unpredictable. For that reason it is so unlike typically instinctive behaviour.

Among the other instincts distinguished by McDougall are those of curiosity, with its emotion of wonder (like pugnacity, having no one definite object to bring it into play, but serving to bring clearly to attention any object

that may stimulate any other instinct), food-seeking, repulsion, gregariousness, acquisition, construction, appeal, self-submission, and self-assertion. Behaviour relative to any one of these instincts can be amply illustrated by examples drawn from the animal and human worlds ; but the latter two have an especial importance in the moral and social life of mankind, as will become clear when the organization of instincts into sentiments is considered.

EMOTIONS AND SENTIMENTS

It was said that most of the instincts in man, when active, involve primary and typical emotions which serve to identify them ; but there are many other emotional states, which are blends or compounds of these, and arise when several instincts are active at the same time. This blending of primary emotions accounts for the peculiar richness of our life of feeling for which language provides us with so many expressive terms. Now, it is a fact that we tend to experience both primary and blended emotions in connection with certain objects, persons, and—as we shall see—ideals ; and this points to a definite and systematic organization of instinctive dispositions around those objects and persons of a very special kind. Such organizations are called “sentiments”, and may be illustrated by the typical sentiments of love for or hatred of a person. Distinguished from the love, or tender emotion peculiar to the parental instinct, the sentiment of love embraces many instinctive or emotional dispositions, any of which may become active according to the different circumstances which may affect its object. Thus, because we entertain this sentiment of love, not only do we experience tenderness in thinking of the loved object, but we fear for him when he is in danger, we rejoice at the

success of his projects, we grieve at his reverses, we are angry with his enemies and aggressors, and we feel reproach against him should he treat us ill. Similarly the object of the sentiment of hatred provokes anger or resentment when he is successful, joy when he meets with reverses, and the like.

Though we find evidence of rudimentary sentiments of this sort in the behaviour of some of the animals, as in the case of the love of a dog for his master, human sentiments are not all aimed at individual objects and persons, but often come to be extended to all the individuals of a class (the love of a mother for her child overflowing to other than her own children, to all young and helpless things, and so on); to quasi-abstractions like one's school, country, or church, in *esprit de corps*, patriotism, or devotion; and to abstract ideals such as honesty, virtue, holiness, or duty.

EXTENSION OF SENTIMENTS

The overflow of mother-love to other objects than her own child may perhaps be accounted for on the ground of association by similarity; but the extension of sentiments to abstractions and ideals requires further explanation. In the first place, it must be shown how abstracts and ideals come to arise in our thought; and, in the second place, how the instinctive dispositions come to be organized around them. For the first, although there are other theories to account for their formation, reference may be made to Spearman's noegenetic theory¹ as providing principles according to which the simple characters of experience, relations, and correlated characters arise in our minds. As such, these are all abstracts; and they can be combined in various ways into complex abstract

¹ Cf. p. 28.

notions which we may contemplate, though it is not for the psychologist to examine their validity. But such notions of themselves can provide no motive for conduct. The motive is to be found in the sentiment directed on the abstract or ideal, or, more properly, in the instincts the organization of which in respect of the object or ideal constitutes the sentiment. If we consider the sentiment of self-regard, into the formation of which the positive and negative self-feeling belonging to the instincts of self-assertion and abasement enter, we shall find a potent driving force for conduct that aims even at the most abstract ideals. For a man, thoroughly respecting *himself*, and possessing such ideals, will necessarily strive to attain them. Because of this sentiment, one after another the basic instincts may be stimulated to activity; and from these the energy that sustains his striving will be drawn. Even should the ideals be illusory, the facts of human life must be accounted for, if possible, by the psychologist. And it is no less a fact than that some men at least cherish deep sentiments of friendship, or are patriotic, or devoted to charitable works, that some also will suffer persecution for the sake of duty, or lay down their lives for a creed.

At the end of Chapter IV an outline picture of the normal human adult was given from the point of view of psychology. This sketch may now be further filled in by details derived from a consideration of Hormic and purposivist principles. The human being is not only a creature of inborn instincts, the operation of which may be guided by intelligence towards biological goals of individual and racial significance and utility. He is this and more; since his instinctive dispositions tend to become organized into sentiments, including the abstract sentiments, which make not only a social, but also a

moral, life possible. Moreover, while we may discern a biological purpose, or reason, in the behaviour of animals other than man, we experience in ourselves a psychological, conscious purpose, an intentional aiming at ends or goals which we not seldom achieve. It is this that gives meaning to human life and value to human endeavour.

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CHAPTER VII

INTROSPECTIONISM AND BEHAVIOURISM

STRICTLY speaking, the terms introspectionism and behaviourism, when used to indicate systems of psychology, are misnomers; for introspection and the observation of behaviour are methods rather than bodies of doctrines, and both methods are commonly used by psychologists of whatever kind (save one) in the pursuit of their science. But greater emphasis has been laid upon one or the other of these methods by different groups of psychologists in the past; and, though at present there are probably few introspectionists of the type of Külpe and Titchener (who sought for the “elements of consciousness”) left, there is a very considerable number enrolled under the banner of at least a mitigated form of what has definitely come to be known as Behaviourism.

INTROSPECTION AS A SCIENTIFIC METHOD

Introspection, as a scientific method, is really one common to the sciences of physics, physiology, and psychology. The physicist employed it, for example, in his investigation of the nature of light, when he spun his top painted with several colours and asked the onlooker what colour he saw. Red and green, he found, appeared as grey; and the reply he got was due to introspection. The physiologist used it in his investigations into the working of the special sensory organs, as when, for instance, he moved a coloured object across the field of vision, and noted that different zones of the retina of the

eye responded in different ways to the same stimulus. Here colour is seen, there none. And physiologist and psychologist alike made use of it in their investigation and analysis of sensations. Sight, hearing, smell, taste, touch, provide us with an enormous variety of experiences, most of which are mixtures of elementary impressions. It was by the introspective method that the elements of taste, for instance, were found to be only four (sweet, sour, salt, and bitter), all other savours being complicated by odours and other sensations belonging to the sense of touch. Similarly, the elementary sensations of vision were reduced to three pairs (black-white, red-green, blue-yellow), all other perceived colours being blends of these.

Introspection, however, did not stop short at the analysis of sensations. It was extended to cover other mental processes also; and the attempt was made to secure complete introspective descriptions of what went on in the mind when, for example, one was comparing one impression with another, or memorizing and recalling material, or solving problems, or judging, or choosing between alternatives. In this way it was hoped to discover the elementary ingredients of these and similar higher thought processes, feelings, and activities of the will. The chief difficulty that was encountered in all this work was that very often the Subjects had very little, or nothing, to report in the way of experience during the period over which they were introspecting; and what they did report was generally not so much a statement of what their actual experience was, as a statement of what it was about. Unlike the earlier work on sensations where experience was reported in a perfectly straightforward way ("I see red", "I feel warmth"), here such expressions were used as "I thought of the long time I was taking to react, and that reminded me that the

instruction was to react quickly." Such statements provide little or no clue to the actual constitutive elements of the higher mental processes.

MENTAL ATTITUDES

None the less, valuable results were obtained by the use of this introspective method. The very absence of some feature that might have been expected in the report suggested explanations. For instance, in experiments upon choice it was found that the actual choice was nearly always automatic. In accepting the instruction beforehand to make a serious choice between alternatives that would be presented later on, the Subject of the experiment made a resolution to choose, and thereby established a "mental set" or "attitude" which worked of itself when the choice came about. Introspection showed no volitional element or quality that was experienced in the period between the presentation of the alternatives and the actual decision, though feelings of various sorts and mental attitudes and images and thoughts might be reported. A similar mental attitude was discovered in reaction experiments, in which the Subject moves his finger from a key so soon as a stimulus is presented to him; and also in relationally predetermined word-reactions, where the Subject reacts with a word in a given relation to a word shown to him (*e.g.*, Give the opposite to . . .). In neither of these cases is any willing or conscious intention to react reported as occurring between the stimulus and the response. In both cases, what willing there is occurs beforehand when the resolution is made to carry the experiment out; in what is known as the "fore period", much intentional activity is reported.

These volitional attitudes agree with the results of

earlier investigations in connection with comparison, in which the method of introspection was also used. If two impressions are given successively to a Subject and he is asked to say which of them is the greater, it had formerly been explained that the first impression had been retained in the shape of a mental image, so that the second could be compared with it. But introspection bears witness to the fact that very often there is no mental image to be discovered with which it could be compared. The second impression is judged greater or less than the first with no introspectible term of reference whatever. How could this be? It was suggested that the comparison depended upon an attitude established by the first impression; and, indeed, in comparisons of lifted weights, it can be actually seen that something of the kind occurs. For, if the second weight is perceptibly lighter than the first it can be observed that it is raised more quickly; whereas, if heavier, the movement is a slower one. This fact is admirably illustrated by the size-weight illusion, in which a large and a small cube of the same weight, or a heavy and a light cube of the same size are lifted one after the other.

Mental attitude, or set, then, though not an elementary constituent, or combination of elementary constituents, of consciousness like a sensation, feeling, or image, seems to be justifiably inferred from the absence of imagery, or the denial of its occurrence, in the introspective report. And this is of great importance in the explanation of many of the activities of everyday life. There need be no real willing in taking one's hat from the peg and putting it on. If this is called a voluntary act, it is because of some such previous voluntary intention as that of going for a walk.

IMAGELESS THOUGHT AND MENTAL ACTIVITY

The absence of mental imagery in such cases as the foregoing links up with the findings of the introspectionists on the matter of imageless thought, a psychological topic of prime controversy towards the end of the last and the beginning of the present century. Do we think and reason in visual or verbal (or other) images, or without images at all? To answer this question a number of investigations were carried out, some very simple, such as the easy problems given to his children by Binet for solution. He found that in solving these problems they often denied having experienced any imagery; and he concluded that there were thought-elements ("pensées"), as well as visual and verbal images, to be taken into account. Other experiments were carried out on judgement, some fairly easy, some very difficult of performance; and the investigators discovered frequent instances in which the so-called "imageless thought" occurred, as well as the conscious attitudes mentioned above. Two definite gains are thus to be attributed to introspection in respect of the higher thought processes. And another gain had already been registered in introspective work on memorizing meaningless material; for it was shown that this does not merely consist in the taking in by a passive mind of materials that became automatically linked together, but rather that the mind is extremely active while learning.

Violent opposition against the claim that thought could occur in naked "thoughts" was raised by some of the introspective purists,¹ who were interested only to discover the structural elements of experience—what our thinking is made of, rather than how we think. But,

¹ Cf. E. B. Titchener, *Lectures on the Experimental Psychology of the Thought Processes*; New York, 1909.

though the work outlined above may not have laid bare the elements of the higher thought processes, it surely has thrown light upon the processes themselves. And so much can hardly perhaps be said for the labours of the critics.

OBSERVATION OF BEHAVIOUR

But more violent opposition still against both purists and other introspectionists alike came from the Behaviourists under the leadership of J. B. Watson. For a long time the observation of behaviour had been used as a psychological method; but the behaviour was generally interpreted in terms of consciousness reached by introspection. A great deal of experimental work had already been carried out both with human beings and other animals confronted with "problem situations"; and the workings of the human mind as introspectively observed had been used by analogy to explain the behaviour of animals, and later on of young children, in such conditions. Animals and young children cannot introspect; or, if they can, they cannot reveal their experiences to us except through their manner of behaving. If animal and child psychology were to be chapters of general psychology, it seemed necessary to link up introspection and behaviour observation in this way.

E. L. Thorndike was a pioneer in this sort of work; and the results of his interpretation of behaviour on these lines are well known. One of his most striking experiments was that in which he studied the manner in which hungry kittens learn to escape from boxes through the slats of which food could be seen outside. Escape required the manipulation of latches or loops of string by which the door was opened, so that the animal was able to secure the food. Thorndike found that the original

useless attempts to reach the goal by trying to push through the bars, by running about, clawing, scratching, and the like, after trials lasting many days slowly came to be replaced by movements that were at once crowned with success. In the meantime the animal, in its blind attempts to get out, had by chance pulled on the loop or pushed up the latch, perhaps very often, and so, little by little, had learned how to escape and reach the food. The time-curves taken from the beginning until such learning was complete showed no sudden drop that might indicate a flash of insight, but rather gave the impression of a gradual acquisition of the habit. From this it was argued that the kittens did not learn to escape by any process of reasoning, nor (probably) by associating any ideas together, but by "trial and error". The right action was stamped in by repetition, and the wrong ones stamped out by the infrequency of their performance. And to this "law of use and disuse" was added the "law of effect", according to which linkages between stimulus and satisfactory response are strengthened by the pleasure of success; while those between stimulus and unsatisfactory reaction are weakened. This fitted in with the still current teaching of associationism; but it was an associationism between stimulus and response, rather than between ideas.¹ Such learning, it was further shown, could not be explained as due to imitation, or even to the animal having been passively made to execute the correct movements; for kittens that had not yet learned to escape were put into the boxes with others that had already learned how to get out, and they showed no evidence of learning more quickly because they had seen the performance of the others. Furthermore, "putting the animal through" the appropriate movements did not

¹ Cf. E. L. Thorndike, *Animal Intelligence*; New York, 1911.

help it to learn them. It had to learn in the course of its own efforts, and by trial and error.

STIMULUS AND RESPONSE

This account of the process of learning in animals (and, indeed, of much human learning as well), taken together with the limitation of the scope of psychology to introspection and the analysis of the elements of conscious experience, prepared the way for a form of Behaviourism in which consciousness was simply left out of account, and behaviour, in men as well as animals,¹ was to be explained in terms of stimulus and response alone. By altering the usual terms, and sometimes their meanings, it was not difficult to express all the old psychological problems and solutions in this way. Sensations and images, with their feeling tones, the old "elements" of consciousness,² thus become transformed into bodily reactions to sensory stimuli of various kinds; and, where these are not observable by the interested psychologist, it is allowed that the Subject can make a "verbal report" upon their occurrence—saying, for example, "I see red", when a visual stimulus is presented to him; or "I see green", when, the stimulus being withdrawn, he experiences a negative after-sensation. Such report is to be taken not so much as an introspection as a statement of fact, which the psychologist may accept, just as the physicist might accept the statement "that is red".

Again, when the Subject reports a mental image or emotional state, though the psychologist cannot perceive these, he knows that he is responding with unseen movements or impulses to movement, or with reactions taking place in his inner bodily organs, that are provoked by the actual stimuli.

¹ Cf. p. 11.

² Cf. p. 13.

Behaviour responses are thus divided into overt and implicit, observable and unobservable, though the latter may possibly be investigated by the use of fine recording instruments. And among the implicit responses are those of sub-vocal language, or inner speech, which is the behaviourist interpretation of "thinking".

Another distinction is also drawn between unlearned and learned behaviour responses, or instincts and habits, whether overt or implicit; and the programme of Behaviourism was to derive all the forms of learned response that constitute developed behaviour from the original unlearned ones without having recourse to consciousness.

This Watson attempted to do at first by making use of the principle of association of response to stimulus, with its sub-principles of frequency and recency, so that (to go back to the case of the kittens) the successful response was learned because it had been more often called out than any other, and also was in fact the last step in the process of escaping from the box. Learned behaviour, then, develops from unlearned by way of association, and by the addition of new ranges of stimuli which become apt to provoke original responses by linkage with those that provoked it in a native manner. Add to this that the ensuing behaviour itself becomes modified in various ways. For instance, in the explanation of thought as sub-vocal language, the unseen movements of inner speech are said to have become substituted for the gross manipulation of the objects which was the original reaction to them.

THE CONDITIONED REFLEX

When the concept of the "conditioned reflex" reached America from Russia, it was not long before it was seized

upon as a most important principle of explanation for Behaviourism. This concept arose in connection with a phenomenon observed, and thoroughly investigated, by the physiologist Pawlow,¹ who was making a study of the process of digestion. Working with dogs, he noticed that the flow of saliva, which is a native reflex to the taste of food in the mouth, before long came to begin before the presentation of the food, and seemed to be a response to the sight of the food-container, or of the keeper who fed the animal. This suggested the possibility of substituting some other "indifferent" stimulus for the one that naturally called out the reflex. Pawlow accordingly experimented with indifferent stimuli, such as the sound of a buzzer, bell, or metronome, and found that after this had preceded the giving of food a number of times, salivation would begin when the buzzer sounded even if food were not subsequently given. This "conditioned reflex", as it was called, died out, however, if the buzzer was too frequently sounded without giving any food. Pawlow was able, by making use of the presence and absence of food in the case of high- and low-pitched tuning-forks respectively, to secure salivation in response to the one and not the other; and, by gradually decreasing the difference of pitch between the forks, he was able to secure the salivary response to a note differing only by a semitone from that other. He ascribed these results to special brain functions, the establishment and inhibition of conditioned reflexes, on the one hand, and, on the other, the analysis from out the rain of stimuli continually striking upon it of the individual stimuli to which the reflexes are conditioned. And he believed that all learning comes about in this way.

These results were taken over by the Behaviourists as

¹ Also by Bechterew, who worked on a similar problem.

admirably fitting into their scheme of explaining behaviour without reference to consciousness ; and Watson's own work on conditioned emotional reactions in young children follows upon much the same lines. Emotions for the Behaviourist consist in unobservable changes (visceral and glandular) that take place within the body as well as observable movements of trunk, limbs, head, and the like. Such emotions are natively expressed only in a few forms of behaviour, of which Watson recognizes three chief patterns—those, namely, of fear, rage, and love. The very young child will respond with fear behaviour (starting, shrinking, cowering, crying), for instance, to loud noises and loss of support ; and it shows no fear in the presence of animals such as rats. But when a loud noise is made each time the infant is shown a rat, very soon, instead of stretching out its hand towards the animal as it does to begin with, it will shrink back from it in fear, even though no noise is then made. It will also shrink away from things that only look like rats, such as other small animals, bits of fur, rags, and the like. To be sure, this is not in strict terms a conditioned "reflex", but as a conditioned reaction it is remarkably like one.

This process of conditioning native reactions, or attaching them to new stimuli, it is held, may account for all learning, in such a way that any child can, by suitable surroundings and training, be brought up to be any type of individual. Nature counts for nothing in comparison with nurture.

The outstanding points in the system of Behaviourism are its rejection of consciousness, in the sense of the associationists and introspectionists (not the denial that we are conscious); the limitation of psychology to the study of behaviour, overt and implicit ; the explanation of thought in terms of movement, and particularly of inner

speech ; of emotion in terms of muscular, visceral and glandular changes ; of memory in terms of renewals of habit responses previously acquired, as well as the bringing into play anew of visceral changes ; and finally the rejection of instincts together with all inherited mental traits of whatsoever kind.

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CHAPTER VIII

LINES OF CLEAVAGE AND AGREEMENT

THE variety of avenues of approach, of points of view, of chosen fields of exploration, of methods of research, of explanatory principles, and, one may add, of philosophical backgrounds, indicated in the foregoing chapters that have dealt with the chief contemporary systems of psychology, will probably give the reader the impression that, if a science at all, this is a science in a very lamentable state. In no other natural science do such confusion and contradiction appear. While chemistry and botany, physics and physiology, still no doubt have their unsolved problems to grapple with, in each there is a definitely recognized subject-matter with which the science respectively deals ; each has its approved principles of explanation ; and each has systematized its data into a consistent body of teaching that no one questions. This would seem not to be so in the case of psychology. Neither on its scope, its definition, nor its method are all psychologists entirely agreed.

Nevertheless, a review of the situation brings to light the immense amount of research work that has been, and is being, carried out along all these different lines ; and, despite the rival claims and apparently exclusive character of each of these psychological systems, there is really much more agreement between them than might appear to the superficial student. Possibly the worst feature of the situation is their mutual exclusiveness ; though, since

each undoubtedly has something of value to offer towards the building up of a complete and unified science of psychology, it is hard to realize why this exclusiveness should have been allowed to develop to so great an extent. It may be that the reason is to be found in the very youth and backwardness of the science, or that it has not yet rid itself so completely as it believed of the entanglements of conflicting philosophies, and found its own feet. It may be that the enthusiasm due to the discovery of a principle, that certainly explains some of the facts to be explained, blinds its discoverer to the value of other explanatory principles, and leads him to seek to make his own discovery cover all the ground. To put it at the lowest, it may be due to the antagonisms aroused by controversy and criticism of points of view that might have been settled by more scientific and less heated discussion. However this may be, it is a matter for regret that the lines of cleavage should be so emphasized, while the points of agreement are generally so slurred over.

In the following bird's-eye survey of the present-day systems, an attempt is made to stress the points of agreement rather than those of difference.

HUMANISM AND SCIENCE

It may be said, in the first place, that it would appear to be certain that both the humanistic and the scientific aspects must, so far as possible, be preserved in any acceptable system of psychology. And this means that we must take the whole range of our experience into account, and attempt to observe and describe it as did the Introspectionists. Even if we should fail to discover in detail any ultimate "elements" of which conscious experience is made up, the attempt is well worth while. Already, as we have seen, it has given us a clue to the way

the mind works when thinking, feeling, willing, and doing, in the dynamics of mental attitudes, in imageless thought, and in the essential activities involved in learning. But, more than this, it is by introspection alone that we can penetrate into the inner emotional life of man, his joys and fears, his hopes and disappointments, his griefs and sorrows. It is true that no one of us has any immediate entry into the inner life of any person other than himself; but for each of us it is the life of the feelings that interests us more than anything else. And we may believe that for the others also it is a matter of supreme interest and importance. Shorn of this humanistic aspect, psychology might well become a science like the physical sciences, but at what a cost! It would have left a vast amount of experience totally out of account, and forfeited its right even to its own name.

INTERPRETATION OF BEHAVIOUR

No less, in the second place, must the study of behaviour be neglected, and even from the rigid point of view of the more orthodox Behaviourists. No doubt, when objectively observed, behaviour may be interpreted in more than one way. It may be explained by reference to one's own conscious experience; or on the supposition that the stimulus-situation calling it out has a biological and unknown, or possibly even a psychological and known, significance for the organism responding to it; or, again, on the lines of native linkage of stimulus and response, together with subsequent associations of previously "indifferent" stimuli and responses, similar to those of Pawlow's conditioned reflexes. There is nothing inherently wrong in following up any one of these lines of interpretation. Indeed, if psychology is not to be a "one-man" affair, but is to include all men (and even animals)

in its scope, data derived from the observation of behaviour, including speech, are necessary for it, since they are the only data that are available to us; and we may be as strict as we please in our use of the explanatory concepts we apply to these data. We may employ the most rigid rules of interpretation, and leave consciousness out of account, wherever possible; but at the same time the fact that the Behaviourists themselves admit the value of the verbal report should not be forgotten. This admission points at least to a door having been left ajar between Behaviourism and Introspectionism.

BEHAVIOUR AND EXPERIENCE

In the third place, Hormic or Purposivist Psychology links behaviour and experience as closely together as possible, and touches acutely on that inner life of feeling and striving that leads to action. The data upon which it works are derived from the twin sources of introspection and the external observation of animal behaviour and human conduct; and the principles it uses in explanation of the data are either drawn directly from experience or else are based upon it. Purpose is one such datum, experienced in its most definite and unequivocal form when we ourselves deliberately choose and consciously undertake some course of action that leads us to a goal. But goal-seeking activity, behaviour that actually does in fact lead towards biologically useful, and even necessary goals, is observable throughout the animal world. In our own case, the end we have in view is more or less clearly envisaged. We aim at it intentionally, and are aware that we are pursuing it. Analysis of our own experience shows that this represented end is not indeed a cause, but only a cue and a guide to the action that is really due to the arousal, by some present stimulus, of a

conative disposition. In lower organisms the action may be very imperfect and ill-defined because the cue is also so; and this is inferred to be the case from the imprecision and lack of direction often shown in their behaviour. Such an inference, however, does not necessarily rule out some sort of rudimentary purpose remotely similar to our own. Purpose, then, together with the general tendencies and the specific dispositions, or instincts, that become organized into sentiments, are the essential contributions of Hormic theory to psychology. They are not incompatible with Introspectionism, for they are partially derived from it, or based upon it. Neither are they incompatible with Behaviourism taken in the broader sense, with the "open door". They have close affinities, as we shall see, with psychoanalytic theory, which also postulates dispositions of which we are unconscious, in the shape of the instincts that are the components of the Id and of the submerged complexes; and they dovetail in neatly with the doctrines both of the origin and of the subsequent fate of knowledge as developed in the Noegenetic system of psychology.

PRINCIPLES OF EXPLANATION

Moreover, when we remember that Purposivism, like Introspectionism, and the Psychoanalytic, Noegenetic, and Behaviourist systems, is a study that aims at the discovery of proximate principles of explanation for observable phenomena, there can hardly be any real contradiction between it (or any one of them) and the Gestalt and Organismal theory. All of these systems make use of physiological concepts of one kind or another in the development of their theories; while Gestalt and Organicism, without in any way denying the phenomenal character of conscious experience, seek to explain it on

grounds of a much more far-reaching nature than those the others employ. They do this by bringing the physiological processes that they postulate as being parallel with experience within the wider and more fundamental scheme of self-regulating distributions of physical energy. These psychologies, further, stress the similarity between volitional behaviour and physical processes such as that of a falling body in tending towards and reaching goals ; and they go even further than the Hormic system in the use made of this notion of goal-seeking. Moreover, the concept of closure is the equivalent in terms of brain action of the insightful discovery of ends, and of means leading to ends, which plays so large a part in Purposivism ; and it also is the equivalent of the conscious discovery of intermediary links and relations in trains of logical reasoning that lead to an evident conclusion, such as are developed and emphasised in Noegenetic theory.

HORMIC PSYCHOLOGY AND PSYCHOANALYSIS

It has been said already that Psychoanalysis has much in common with Purposivism, in that it postulates unconscious dispositions that affect both consciousness and behaviour. Though it is a pathological formation, the complex seems to be an exact parallel of a normal sentiment. The Super-ego, too, is a development that emerges, like conscience, within the framework of positive and negative self-feeling which characterize the instincts of self-assertion and abasement ; for the Super-ego, in psychoanalytic theory, is derived from the aggressive instincts of the child that come to recoil upon itself. Psychoanalysis, again, in the emphasis it lays upon dreams and phantasies, as well as upon unconscious dispositions, cannot be said to have any quarrel with Introspectionism ; nor, indeed, with Behaviourism in so

far as both refer behaviour to unconscious motives and drives in the shape of mechanisms, whether psychical or physiological, that are held to account for it. Even if these should not be mechanisms at all, but dynamic systems of energy, as Gestalt theory teaches, it would seem to indicate a philosophical problem and solution rather than a psychological one ; for questions of ultimate explanations belong to philosophy, not science.

NOEGENESIS AND BEHAVIOURISM

Noegenetic theory, lastly, since it is concerned with processes of conscious knowing only, can hardly run counter to any other system except in so far as the latter deals, or refuses to deal, with processes of knowing. And of those only two need be considered—Behaviourism and Gestalt theory taken together with Organicism. So far as Behaviourism goes, we have seen that it leaves consciousness out of account, though it does not deny that we are conscious. From the behaviourist point of view, accordingly, the discovery of noegenetic and quantitative laws might be a work of no psychological value, for the Behaviourist would find no use for them in his explanation of behaviour and conduct ; but it would not follow that the laws were not true psychological laws quite apart from any bearing they might have on behaviour. If, on the other hand, these laws can explain how we arrive at the formation of those social and moral ideals upon which the Hormic sentiments may become directed, so much the better ; for Behaviourism gives us no real clue to the stimuli that call out truly social and moral conduct.

NOEGENESIS AND GESTALT

So far as the Noegenetic and Gestalt systems are concerned, despite some criticism and controversy, there

seems really to be a good deal in common. Both make the process of knowing objects begin with the perception of unitary wholes (figure on ground) in which related characters may be discovered on analysis. A simple object, such as a red triangle, is an instance; and there is certainly something more than redness and triangularity in this figure, for it is not a mere sum of the two characters. Both stress the importance of relations; the one by making their discovery a stage in the process of creative thought that leads to the production of correlates,¹ the other by making insight a definite determination in a context,² as when an ape grasps a stick as a means for drawing food into its cage; which is another way of saying that the perception of a relation leads to the stick being seen as a means to an end. It is now not merely a stick; it has become a tool. And, as such, it is a correlate.

CONVERGENCES AND AGREEMENTS

Though this survey of contemporary systems of psychology is of necessity very brief and condensed, the hope may perhaps be entertained that it is sufficient to show at least some lines of convergence and points of agreement between them, even when at first sight they seem most discordant. No doubt there are still controversies, and each system in turn comes in for criticism from the proponents and adherents of the others. But this, after all, is a sign of health and vigour in a growing science, and certainly not one of decrepitude or decay. From the very criticisms and controversies themselves nothing but good can arise in the end. And, in the meantime, as has already been said, principles derived from all the systems are being put to practical use with great success in the

¹ Cf. p. 27.

² Cf. p. 49 *sqq.*

various branches of applied psychology. Even if this is no more than a test of working value, it is a good one ; for it seems to indicate not only that the apparently exclusive principles are not in fact so mutually exclusive as they appear to be, but also that each system has its contribution to make towards the building up of a unified theoretical psychology upon the lines of experimental testing.

PRACTICAL APPLICATIONS

As will be more amply illustrated in the following chapters, educational practice has very generally taken over the use of mental tests, thus openly or implicitly accepting the Noegenetic and Two Factor Theories. It increasingly employs methods of teaching and learning by wholes rather than by parts, allowing the detail to develop within the whole as the child progresses in knowledge, thus practically applying leading principles of the Gestalt and Organismal systems. Again, when the teacher is confronted with a difficult, maladjusted, or "problem" child, recognizing the worth of psycho-analytic methods of diagnosis and treatment, he hands the case over to the team of psychologist, psychiatrist, and social worker of a Child Guidance Clinic. The teacher, moreover, being an artist in character formation as well as an instructor, or imparter of information, strives to form and nourish desirable sentiments in his pupils upon the solid bases of the instinctive dispositions, thus explicitly or implicitly relying upon the principles advanced by the Purposivists. A very great part of the time of his working day is taken up with "conditioning" the reactions of the individuals he is teaching ; and even in setting the common tasks of school work he is calling out in the children the mental attitudes or sets that steer

and carry their performance of the task to its completion. Even behaviourist and introspectionist traits thus come into the picture.

Much the same story might be told of the application of principles borrowed from these various systems by psychological medicine. The medical psychologist no doubt chiefly relies upon analysis in probing down to the deep-seated causes of the ailments of his patients, and depends upon analytic theory for the methods he employs in dealing with them. But he both analyses and treats them as whole personalities, and not piecemeal. He breaks up the morbid complexes by detaching them from the objects upon which the instinctive tendencies had become fixed, and by converting them into normal sentiments that come to be directed upon wholesome objects. And in this way he establishes deep-seated mental attitudes of a desirable kind, replacing fears and anxieties by tranquillity and confidence. This, again, is a sort of conditioning. He allows the patient, further, to discover for himself during the course of the analysis the nature of the complex that is the source of his condition, to realize on his own account what the transference means, and, as the phase of transference passes while the analysis progresses, to find new outlets for his emotional needs. All this is a discovery on the part of the patient, and, from the point of view of his understanding, consists in the grasp of relations and the creation of correlates.

We need not here attempt a similar analysis of the way in which industrial psychology, criminology, or any other branch of applied psychology makes use of principles borrowed from the different theoretical systems that seem to be so opposed to one another at the present day. If he pleases, the reader will have material in the following

chapters which he may analyse for himself along the lines developed above. But what has already been said would appear to support the contention that, even so far as the apparently exclusive systems are concerned, the state of contemporary psychology is really not so bad as it seems, and that there are even now signs ahead of a possible synthesis at any rate between some of them. Nor should it be forgotten that the great majority of professional psychologists are not adherents of any one of these systems as such, but are ready to take over into their general psychology whatever may be acceptable from them all. Apart from their building up of theoretical systems, however, the systematizers themselves, as was said, have done an enormous amount of work, and have brought to light a vast array of facts that must somehow be accounted for by psychology. They have suggested certain principles of explanation of these facts, many of which are not mutually incompatible, and as a matter of fact are used as supplementary to one another by most psychologists. It can only be from the common co-operation of them all that any acceptable and agreed psychology will arise in the future.

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SOME APPLICATIONS OF PSYCHOLOGY

CHAPTER IX

EDUCATIONAL PSYCHOLOGY

APART from the special uses to which psychology has been applied in details of educational practice, of late years the teacher's own outlook has been altering under the influence of his increased psychological knowledge. He has to-day a far deeper insight into the workings of the mind in its different stages of development than he had a generation ago, and he is consequently far better equipped than his predecessors were both for teaching and for shaping character. Enlightened parents, too, are coming to realize, not only that they can greatly help or hinder progress during the actual school years, but also that the pre-school period is of the utmost importance in the mental and moral development of the child; and they are beginning to turn towards psychology for information about their children. Parent and teacher alike have come to see that mentality is a gradually maturing possession, which grows, as the body grows, through a series of phases, only in a perspective of which can each phase be understood. And they realize the need of such understanding if they wish to help the child in the successful negotiation of one phase after the other.

From the very outset of the life of the individual, a number of trends of activity appear, independently of all

previous experience, and having their origin in internal states of the body. These lead to the satisfaction of physical needs, such as those of nutrition, rest, excretion, and exercise. Readers who recall the chapter on psycho-analytic theory will recognize the importance of skilful handling during this phase, even if they do not literally and fully accept the findings of the analysts. Feeding, weaning, and learning cleanliness are major events in the life of the baby; and normal mental development may be obstructed by mishandling, with a possible consequence of very serious results in after life.

INSTINCTS AND EMOTIONS

Then there are also the instinctive trends that are called into activity by external stimulation, most of which show themselves in early infancy. Here again mishandling, by over-indulgence or undue repression, is dangerous. The realization that instinctive behaviour is perfectly natural, and not due to perversity or naughtiness, will lead the parent to aim at wise guidance and control. The chief dangers here are connected with the emotions of fear, anger, and self-esteem, that belong respectively to the instincts of escape, pugnacity, and self-assertion. Childish fears may become associated with perfectly harmless things, and lead to unreasoning terrors and anxieties that tend to persist, or to be reawakened with possibly crippling effect in later years. Apart from "conditioning",¹ fear is a contagious emotion, and is often contracted from parents or others who show signs of it. It may also be instilled by threats (the policeman, bogies, the all-seeing eye), or actual punishments, such as being shut up in the dark, which may induce a lasting phobia. The child should be carefully sheltered from

¹ Cf. p. 80 *sqq.*

fears of this kind, and led by example to control any fear that may arise spontaneously, if mental health during the crucial time of early character formation is to be secured and maintained.

Another powerful emotion that needs control during childhood is anger, which is provoked by the thwarting of any of the native impulses. In its cruder forms anger leads to anti-social behaviour; but when properly controlled its drive makes for that persistence of effort in spite of obstacles that is one of the foundation stones of character. Control is generally learned and secured through the painful experience of giving way to rage without effect; and, unless pandered to, the child usually soon discovers for himself that exhibitions of anger and tantrums do not pay, and so holds himself in check. Since he is bound to meet with anger-provoking occasions later on, the importance of the early learning of self-control is clear.

Another powerful drive urges the child to try to attract the attention of others to himself. If successful, he experiences feelings of pleasure and self-confidence, which are most important ingredients in the sentiment of self-regard, and indeed are essential to the higher development of character, will, and personality. The common tendency of little children to attract attention to themselves by "showing off", accordingly, should not be unduly checked, lest their self-confidence should be shaken and a sense of inferiority implanted in them, which might render them unfit for proper social adjustments later on.

FOUNDATIONS OF CHARACTER

While the foundations of character are thus being laid down by the exercise of the inborn trends and the forma-

tion of social and moral sentiments, the child is maturing in other respects also. Before long he has learned to manipulate objects, to walk, to speak, to think; all which acquisitions still further increase his mental horizons. As shown by the way in which his power of using language develops, his thinking in particular makes great strides. He begins to distinguish himself from the outer world, and gradually makes this distinction more precise. He begins to differentiate between the real and the imaginary; though he still easily confuses them, and often relates his own fictions as facts; which not seldom leads to his being, quite wrongly, considered untruthful. He begins to form some nucleus of a moral code in his notions of good and naughty. And he has been making his earliest social contacts, and adjusting himself to the members of the little circle in which he lives by forming sentiments in their regard. If the adjustment is successful, and if his crudely emotional life is refined under the influence of his enlarging experience and knowledge, he is ready for the wider sphere of social relationships that opens out before him when first he goes to school.¹

ENTRY ON SCHOOL LIFE

When the child first enters upon school life, he has to make new contacts and adjustments and occupy himself with fresh interests. Here again difficulties may arise that need careful handling; and the teacher can use his

¹ For a book of this kind, it may seem that too much space is given to this condensed summary of the psychology of the early years of childhood. The justification is the extreme importance of these early years; and, if the foregoing lines have done no more than indicate some of the problems, they may perhaps lead the reader to their further investigation in works dealing *ex professo* with the subject.

psychological knowledge to advantage. As before, perhaps the chief difficulty to be overcome is the fear or anxiety aroused by the novel surroundings of the school and the necessity of fitting in with them. Nowadays the transition is often eased by the use of the play method, in which the spirit of make-believe promotes collaboration and helps in the establishment of friendly relations and freedom of self-expression. The nature of the play alters with the age of the child; but at five or six it shows that he has considerable power of imagination, while later on it becomes more matter-of-fact and definitely practical. This seems to run parallel with the child's normal inner life of phantasy, where dreams for him are still realities, and the marvels of fairy tales are not questioned. But at the same time the child is also keenly interested in the real world; and only when this presents obstacles difficult or impossible for him to overcome is the danger of taking refuge from it in phantasy or day-dreaming incurred. This—"the flight from reality"—which may begin now or later on, is a very serious danger, and may result, not only in the child's failure to adjust himself satisfactorily to his surroundings, but even in nervous troubles or various forms of juvenile delinquency. Here the teacher can often be of great assistance in helping the child to understand the nature of his problems and to face them squarely. The teacher has, however, to reckon with other influences than his own and those of the school upon the child in this undertaking; and in serious cases of problem children he may need to have recourse to a Child Guidance Clinic.

CHILD GUIDANCE

There is possibly no more striking instance of the application of psychology to education than the institu-

tion of these Clinics, where the individual child is studied and treated by a team of specialists, consisting of a psychiatrist and psychologist, together with a social worker who investigates the home and environmental conditions of the case. It is impossible to give in detail here an account of the many-sidedness of the work undertaken in these Clinics; but it may be said that they deal with all kinds of maladjustments, both intellectual and emotional, ranging from excessive timidity, inability to make progress, stammering, and the like, to grave juvenile delinquency like truancy, lying, or stealing. The child referred to the Clinic is never regarded as a culprit, however, but rather as a patient to be helped and treated; and the aim is prevention of undesirable habit formation as well as cure. In all serious cases a medical overhaul is given, and a psychological examination carried out. The background of the development of the individual case is carefully gone into, and the personal and family history also taken into account. It is, however, the psychological examination that is of most interest to us here; for in this lies a direct application of psychology to education.

A test of general intelligence¹ is given, in the first place, to ascertain the mental age (the age indicated by success in the tests for any given year) of the child, for his mental age may not tally with his real age in years and months; and the lack of correspondence is frequently a source of trouble. Testing on a large scale has shown that there are immense differences between individuals, ranging from idiocy to genius, in their intelligence; and it is known that, though general mental ability increases with age up to sixteen years or so, the ratio between mental and chronological age remains practically con-

¹ Cf. p. 20 *sqq.*

stant. This ratio is known as the Intelligence Quotient,¹ and makes the grading of individuals, in respect of their general mental capacity and ability to profit by education, possible. The following table gives norms that have been established for intelligence by L. M. Terman.

I. Q.	Intelligence.
140 and over	Near genius or genius.
120-140	Very superior.
110-120	Superior.
90-110	Normal or average.
80-90	Dull.
70-80	Border line (deficiency).
50-70	Feeble minded.
25-50	Imbecile.
25 and less	Idiot.

USE OF INTELLIGENCE QUOTIENTS

One use of ascertaining the intelligence quotient is obvious. It permits of adapting the type and degree of education to the individual concerned. It would be useless to send a child with a very low I. Q. to an ordinary school, for instance, or to expect such a school to provide all the opportunities of which a child of very high I. Q. could avail himself. The former case is met by the provision of special schools, the latter by special methods, such as the "project method" of study, or individual tuition.

The great majority of children, however, do not belong to these extremes, but cluster around the average or normal; and even here difficulties frequently arise. A

¹ It has recently been suggested that the term "Intelligence Quotient" is misleading; and it has been proposed to substitute for it the term "Index", qualified by the name (Binet, Terman, etc.) of the particular test used.

child whose I.Q. is 115 has an advantage over one whose I.Q. is 85. Yet both may be, and probably are, in the same class at school. In such a case the brighter child masters his tasks with ease, while the duller is not able to keep pace with the class. The one has idle time on his hands; the other becomes discouraged and loses interest. One does not, indeed, need intelligence tests to predict what might, and often does, happen in the way of both children turning to mischief as an outlet for boredom on the one hand, or discouragement on the other. But tests, which presuppose no school learning, make for precision, and enable the psychologist to say with some certainty what should be done. The teaching, so far as possible, should be adapted to the mental age.

EMOTIONAL DIFFICULTIES

But this at once raises a further difficulty. Should some of the children be much younger than others, when graded according to mental age, emotional disturbance may arise precisely for this reason, especially if the older are physically over-developed and the younger under-developed for their age. Some may become bullies and ringleaders in mischief; others may be terrified and cowed. The mere statement of the two situations will show how impossible it is to draw up general rules in such matters, and how necessary it is for the psychologist to take every individual case on its own merits and advise accordingly.

General intelligence, however, is not the only mental power that may need investigation; for similar troubles may arise from special difficulties encountered in one or other of the school subjects, such as arithmetic or reading, which involve special abilities also. These, if they are not actually due to lack of the ability required, call for

remedial teaching and treatment. It will be seen that one great importance of the results of these tests is the indication they give of possible causes of emotional maladjustment. When the cause is known it can be dealt with directly to the great advantage of the child.

But, besides general intelligence and special aptitudes, there are also inborn individual differences of a temperamental and emotional kind to be reckoned with, exaggerations or defects of native dispositions, such as those of pugnacity, self-assertiveness, or sex, which, under the influence of the home or other surroundings, may issue in anti-social and delinquent behaviour. These also are investigated at the Clinic, especially with regard to their environmental causes; and usually, by attacking the latter, the difficulties can be dealt with satisfactorily.

FURTHER APPLICATIONS OF PSYCHOLOGY TO EDUCATION

Besides this important general application of psychology in the treatment of difficult, problem, and delinquent children by Child Guidance Clinics, there are many special applications of the science to details of educational practice also. Some of these are positive and some negative. One, in particular, is the growing use of intelligence tests in connection with scholarship examinations. These tests, as we have seen, allow of the calculation of an Intelligence Quotient which tends to remain constant during the maturing of intelligence itself; and accordingly permit of prediction as to the future success of the candidates selected, irrespectively of any attainments they may have gained by schooling. On the other hand, many old-fashioned methods of teaching, based on questionable hypotheses, such as that of formal training, or the supposition that training in one school subject helps in the acquisition of another, have gone by the board, except

when the subjects are very closely related in character. Methods of memorizing by wholes at a time ¹ (within limits), and by spacing out the learning periods,² have been substituted for memorizing by parts, and for frequent repetitions crowded together at the same time, with a great consequent saving both of labour and time over the older methods. The psychology of various teaching and learning methods in special subjects, such as arithmetic, reading, writing, and spelling, has been investigated with results that are capable of fruitful application. As an instance of this, it has been found that the practice of silent reading tends to eliminate not only lip movements, but also inner speech, thus making for far more rapid reading with no consequent loss of apprehension of meaning. Again, the teaching of reading by the whole-word method, rather than by having the child put words together from letters of the alphabet previously learned by heart, has been proved to be advantageous. The study of eye movements during reading also has shown that these are not continuous, the actual perception of the words taking place during a number of short pauses that occur between a series of lateral jerks as the eyes move along the printed line. Too many pauses mean waste of time, and frequently lack of understanding of what is read. Since it is possible to remedy this defect, the contribution of psychology here is of distinct educational value.

Besides the many applications of psychology similar to those of which a few examples have been given above, there are all those concerned with problems of school management, distribution and size of classes, promotions, recess-periods, recreation and organized play, home-work, and the like. These are of greater practical interest to the teacher

¹ Cf. Cap. V.

² Cf. *ibid.*

than to the general public, and no more than a reference to them need be made here. The public, however, benefits by them both directly and indirectly in the influence of education upon their children, and in the social improvement brought about thereby. No one less than the teacher would claim that the present system of education is perfect; but it is certainly a vast improvement upon previous systems, or lack of system. And, so far as this is so, psychology can take a large share of the credit to itself.

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CHAPTER X

INDUSTRIAL PSYCHOLOGY

EVER since the Industrial Revolution, and until comparatively recent times, there is perhaps hardly anywhere more than in industry that the human factor has been so grossly neglected. Men and women workers had come to be looked upon as little more than so many cogs in the machines, to mesh in with the steel cogs of the turning wheels of output, and to produce as much as possible for the employers, or else to be broken and cast aside. Even at the beginnings of the application of psychology to industrial problems, it was increased output and consequent profit that was aimed at, rather than the comfort, benefit, and happiness of the employees. In fact the movement was begun not by psychologists, but by the so-called efficiency engineers, industrialists whose concern was merely to speed up production. They gave the lead, however, to the psychologists, who were not slow to adapt their methods both to the increase of industrial efficiency and to the personal advantage of the workers.

One of the first problems to be taken up was that of muscular movement. It was observed that in many trades old-fashioned methods, or no methods at all, were followed. There was no convenient arrangement of tools or materials, no proper division of labour; time was wasted in finding what was wanted and by the wrong men being put to wrong jobs. These defects could be remedied by planning orderly layouts of materials and tools, and by seeing that skilled workmen were not given

tasks requiring little skill, nor unskilled men put to those that called for more. When this was done, the result was a very considerable saving of time and a considerably increased output, at no greater expense of labour.

MOTION STUDY

But a more important and original study was that of the movements actually made by the individual workers in whatever task they might happen to be employed; for it was observed that some made many more movements than others in carrying out exactly the same operation. In this "motion study" an analysis of the movements into their component parts was undertaken, with a view to reducing the number of separate movements by cutting out the useless, and especially the more fatiguing ones, and by combining several angular, jerky movements into a single, smooth, and flowing curved unit. After considerable study, the method by which the analysis was made was perfected by the use of apparatus that made it possible to construct a three-dimensional wire model of the complete course of the movement, showing at the same time its extent, speed, and direction in detail. This is known as a "chronocyclegraph"; and it is secured by taking two photographs at the same time, and from slightly different angles, of the lines of light traced on the plates of two cameras by a glowing electric-light bulb that is fixed to the moving limb or hand of the worker. The light is interrupted so many times a second in such a way that the separate traces left on the plates show the duration and direction of the movement by fading from a brighter to a dimmer glow, thus appearing as arrows, or pointers. And the extent is registered by means of a grid of squares of known size that appears on the same plates.

From these photographs an exact model of the actual movement can be built up by using a stereoscope and directly copying to scale.

Comparison of these models shows that the movements made by different workers vary considerably in the same operation; and it enables the investigator to determine the most economical combination of part movements, and also to suggest further improvement. This would seem to indicate that there is a "best way" of performing every operation, and that all workers of whom it is required should be taught the best way, if they have not already hit upon it for themselves. The suggestion, however, goes too far, in that it ignores the large differences between individuals that have to be taken into account in this, as in all other human problems. Operatives who have already become used to one particular way of working often find it very difficult to change. It is proverbial that old dogs cannot be taught new tricks. And accordingly approximation to the best way is more easily secured in the case of new workers who can be shown the most economical procedure, and taught how to avoid useless movements that otherwise by repetition might become habitual.

The general methods of learning apply here, as elsewhere.¹ One is that the best sequence of movements should be secured from the very outset of learning, and that any errors should be discovered and corrected at once. The other is that the practice periods should be short, and spread out over a considerable time rather than long, and closely grouped together.

Apart from learning how to avoid unnecessary movements, however, there are several other aids to economy of time and effort in working. Among these may be

¹ Cf. p. 104.

mentioned both symmetry and rhythm. Where both hands are used, similar motions, where possible, are easier to make than dissimilar ones; and rhythmical actions call for far less energy to perform than disjointed movements.

But, while these and other means may be taken to secure increase in output and economy of labour, the psychologist does not neglect the emotional side of the workers' life in so far as this may be affected by their use. Clearly, if they mean advantage to the employer only, the employee is not likely to regard them with much favour; and any attempt to impose them upon the workers risks the danger of causing industrial discontent and unrest. If, on the other hand, either by increase of pay or leisure, together with decrease of fatigue, the worker himself gains, and realizes that he gains, his emotional life will have been adequately safeguarded, and even heightened, and he is likely to adopt the new methods willingly.

FATIGUE STUDY

Another subject related to efficiency in work and also to the health, comfort, and general well-being of the workers, has been closely studied by psychologists with a view to practical application in the solution of industrial problems. It is that of fatigue. Taking over the findings of the physiologists as to the nature of muscular and mental, or nervous, overstrain, the psychologist set about investigating methods for their prevention, or at least diminishment. It was known, for example, that muscular tissue in contracting uses up fuel stored in the body, and produces by-products of a poisonous kind, both of which in time would make further muscular contraction impossible, the one by exhausting the available fuel

supply, the other by poisoning the tissue itself. Provision against such an eventuality, however, is provided for by the mechanisms of the nervous system. The nerves that supply the impulses to the muscles end in "plates" which become fatigued before the muscles do; and the ingoing impulses from the contracting muscles to the spinal cord serve to increase the resistance at the nerve junctions, so that outgoing impulses that would cause further contractions are impeded.

A very similar state of affairs comes about in respect of the mental fatigue that monotonous work engenders, though here the nerves of the brain, rather than those of the spinal cord, are involved. The work we are doing serves to keep other matters out of our minds for a time; but after a while they begin to intrude upon us in the form of wandering thoughts. If we try to banish these, and get on with the work, we begin to be bored, just as we do when we try to overcome local muscular fatigue; and in the end the effort to attend and carry on becomes weariness, which is a sign of oncoming nervous fatigue of a more serious kind. Boredom may be relieved by securing a fresh interest in the occupation in hand, or by turning to another task. Weariness, which is an incipient fatigue of the higher nervous centres, cannot be relieved in these ways; it is a danger signal warning us to stop.

It will be seen that fatigue is a very complex thing; there is no really good test or measure of it, either for laboratory use or elsewhere. In practice, however, it is usually reckoned in terms of decreased output, spoiled work, time lost through sickness, and the occurrence of accidents; and these may be measured in a fairly straightforward fashion.

WORK CURVES

Output, both as regards quality and quantity, can be plotted on work curves that show the amount of production during equal time intervals spread over the working day; and a study of such curves, which require very careful and expert interpretation, shows the way in which fatigue fluctuates and accumulates during the working periods. Typical curves show an initial rise in output, indicating a period of warming up to the task. This is followed by a slightly lower level that falls away more or less gradually according to the nature of the work, showing settlement and practice effects, and an end spurt, or rise, when the work is drawing to its close. There are often incidental rises here and there also that are due to various influences, which the psychologist must take into account.

When the work is interrupted, as it usually is, by a luncheon hour, this has an effect upon the shape of the curves, according to the nature of the employment. Heavy muscular labour shows a quick initial rise in output, followed by a fall, in the morning, with a good recovery but steeper fall during the afternoon. The curve for skilled work rises more gradually and tends to maintain its level during the first working spell; but in the afternoon it begins at a lower level than before, though it tends not to fall away so steeply. Other variations in the shape of the curves are observed in other kinds of work, such as that in which machines play a principal part, and especially machines that call for rhythmical movements from those who are operating them.

One result from the study of work curves is of the greatest value. By comparing curves obtained in varying circumstances for the same kind of task, the expert can

see at once whether any alteration in the way of working, or distribution of the work itself, has an effect both upon output and fatigue, and what that effect, if any, may be. Thus, irregular curves show excess of effort and defect of habit and rhythm. Good curves should not drop too steeply towards the end of the working spell, for that would indicate undue fatigue.

Two characteristics should be chiefly taken into account in any comparison of work curves—their general shape and their level. Thus of two curves of the same shape, but of different level, the higher indicates greater output with no increase of effort or fatigue. If, however, the higher level curve is of a worse shape, this means that, though the method of working is quicker, it is also more tiring. Again, the two curves may be on the same level, but the shape of one an improvement on that of the other. Here the better curve shows less fatigue in producing the same amount in the way of returns. Finally, one curve may be both on a higher level and of a better shape, in which case an easier, quicker, and less tiring method of work is shown as producing a better result.

The reader will appreciate the necessity of expert analysis and interpretation of these work curves, into which so many factors enter, especially when it is a question of reducing fatigue without impairing industrial efficiency.

REST PERIODS

The facts that the general character of the work curve is repeated day after day, showing recovery due to the intervening nightly rest, and that the midday break also indicates some delay in the onset of, and recovery from, fatigue, naturally bring us to the questions of the possi-

bility of shortening the hours of the working day as a whole, and of introducing brief rest pauses here or there during the actual periods of work.

The natural remedy for fatigue is rest and relaxation, particularly that which is enjoyed during sleep, when the fatigue poisons are carried away from the depleted and poisoned tissues by the lymph and blood streams, and eliminated from the body. Added to this is the restoration of the used-up material by the intake of food. But, apart from the daily rest imposed by Nature, and those other breaks that are sanctioned by social usage or imposed by legislation, it is possible that fatigue may be lessened, without diminishing the output, by shortening the working day, and warded off by resting from time to time during the spells of labour. And both these possibilities have been found capable of realization in very many directions, as well in heavy and light industry as in clerical occupations of various kinds.¹ The reader will once again readily appreciate the fact that the determination of the most suitable length of the working day that is at the same time the most productive and the least conducive to fatigue, as well as of the most suitable length and distribution of the rest pauses, is a matter for expert investigation in every case. But the actual application of the results of fatigue study to so many industries, with ensuing advantage both to employers and employees, constitutes a good argument in favour of applying them to others.

Over and above what has already been said, there are a number of conditions which make for fatigue that can often be easily avoided. Among these are unnecessary standing and bending, bad lighting and ventilation,

¹ The benefits are not apparent at once, but show themselves later on.

excessive damp or dryness, and overheating. The industrial psychologist takes all these, as well as other relevant matters, into account in any investigation he makes in respect of industrial efficiency, keeping always in mind the human factor whose advantage is as much, and even more, his concern than that of the individual firm or corporation who employs him.

VOCATIONAL SELECTION AND GUIDANCE

An even more striking application of psychology to industry, both as regards the work and the individual workers, is that which enables suitable individuals to be selected for any given employment, and suitable employments determined for those who desire work. The value of vocational selection and vocational guidance, and especially of the latter, has already received considerable wide and well-merited recognition from the general public, who are beginning to realize the importance of choosing careers for their children in which they are most likely to succeed, rather than letting success be no more than a mere matter of chance.

For vocational selection, or the choosing of suitable applicants for any employment, a detailed knowledge of the requirements of that employment, in the way of physical and mental abilities, is clearly necessary. The Staff Manager knows what he needs when engaging his staff, and makes his choice of applicants accordingly, generally on the strength of an interview, testimonials, records of achievement, and the like. If he wishes to employ a more scientific procedure, he may make use of psychological and physical tests; but this is hardly necessary, unless he is engaging beginners, and needs to know whether they possess those

aptitudes on the basis of which the required abilities will be likely to develop later on. And then, unless he is himself a psychologist, he will need the services of an expert.

Vocational guidance is contrasted with vocational selection. Here, instead of looking for abilities and aptitudes that fit the applicant for the post, the psychologist looks for posts that will fit the abilities and aptitudes of the applicant. In this work of guidance, again, he must have a detailed knowledge of all the requirements of the possible occupations. But his chief concern is with the physical and mental make-up of the individual requiring guidance and advice as to the employment in which he is likely to achieve success, as well as to find contentment and happiness in his work. To meet this, the psychologist makes use of physical and mental tests, by means of which he can assess, not necessarily so much the actual attainments of the testee, as the possibilities of his attainment. Though physical tests, such as those of muscular strength and endurance, may be important in respect of some kinds of employment, of still greater importance are the mental tests on the results of which the vocational advice is based. These include, in the first place, a test of general mental ability, upon the possession of which some occupations obviously make far greater demands than others. A Table of Intelligence Quotients such as that given on p. 101, which indicates the levels of intelligence from genius to imbecility, can easily be converted into a Table showing what sort of possible occupations may be suitable, other things being equal, for persons who attain any given level as a result of the test. Thus, C. L. Burt has established the following table showing the kind of vocations possible for persons of any given I.Q.

TABLE OF VOCATIONAL CATEGORIES.

I. Q.	Vocational Category.	Distribution (% of adults).
150 plus	Highest Professional and Administrative	0·1
130-150	Lower Professional and Technical	3
115-130	Clerical and Highly Skilled	12
100-115	Skilled and Ordinary Commercial	26
85-100	Semi-skilled and Poorest Commercial	33
70-85	Unskilled and Coarse Manual Labour	19
50-70	Casual Labour	7
50 minus	Institutional and Imbeciles, Idiots	0·2

(After Burt; *British Journal of Psychology*, Vol. XIV, 1924.)

INTELLIGENCE, APTITUDE, AND CHARACTER

But the possession of a given inborn amount of intelligence alone is no sure indication of an occupation that may be suitable; for the human being is not a bare intelligence, but an individual who also possesses, or lacks, special aptitudes that are required for this or for that particular calling; and, moreover, he may by temperament or character be fitted or unfitted for it. Accordingly, tests for special abilities are also given. It was said on p. 23 that a common general factor, together with a specific factor that varies from one operation to another, enters into every mental performance. With a few exceptions, it is not these multitudinous specific factors that are tested in detail for the purposes of vocational guidance, but rather what are known as group factors, or aggregations of several specific factors, that are involved in performances of closely similar kind. Among the exceptions are musical and mathematical ability; and the chief other faculties tested are practical, mechanical, and verbal ability, together with manual dexterity. Memory occupies a rather peculiar place; since, though there are group factors here, no one kind of test material serves to measure memory as a whole.

It has more than once been emphasized that the giving of mental tests in general is a matter for the expert ; and this is even more true in connection with these special abilities. The tests themselves, considered as measures of ability, are far less exact than are the intelligence tests ; and their results require the most careful and skilled interpretation. Nevertheless, they have proved valuable in practice, especially when considered together with the observations made by the psychologist on the way in which the testee attacks and performs them. These observations also give him some insight into the temperament and character of the latter, which, no less than general and special abilities, must be taken into account in the matter of vocational guidance. Since there is no reliable test either for character or for temperament, the vocational adviser, like the medical man diagnosing his patient, must rely largely upon empirical examination to come to his decisions ; and for that reason he himself requires a training in which a foundation of sound theory must necessarily support the edifice of practice.

OTHER FACTORS TO BE CONSIDERED

A large number of problems other than those considered above have been successfully attacked by the industrial psychologist, to which no more than a passing reference can be made. Among these are the questions of the personal interests of the workers, of incentives to production, and the like. A great deal of work has been done, also, on the subject of advertising and salesmanship, the object of which is to appeal to a need or desire, or to create one, for a particular article or product, to impress the public or the prospective buyer with its excellence, and, by associating a name, trade-mark, or slogan with it, to fix it indelibly upon the memory. Though the appeal

of advertising is made to needs or desires that are connected with one or other of the instincts, the approach is made by way of attention and the laws that control it. And, since these have been very fully investigated by the psychologist, scientific advertising has reached a high state of efficiency. Finally, a word may be said on accident proneness and prevention. Apart from the many other conditions conducing to accidents in industry such as inherently dangerous callings, the manipulation of dangerous machinery, fatigue, and the like, there are individuals who appear to be specially prone to accidents, either to the materials they are handling or to themselves. Our knowledge in this matter does not as yet extend very far. Some physical defects and diseases, however, are known to make for accidents; and persons suffering from them should avoid occupations in which there are undue risks. So far as psychology is concerned, tests of sensory-muscular co-ordination have been used with some success as indicating one at least of the factors of accident proneness.

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CHAPTER XI

MEDICAL PSYCHOLOGY

THE search for psychological principles applicable to medical problems, and particularly to the treatment of functional nervous diseases like hysteria and the psychoneuroses commonly called "nerves," led in time, as we saw in Chapter IV, to the building up of an immense superstructure of theory upon the basis of the empirical observation of pathological symptoms, and the discovery of their underlying causes. This is Psychoanalysis, which has been in process of elaboration by Sigmund Freud during a long period of years. But Psychoanalysis is not the only theoretical system advanced in medical psychology, nor is its special method of treatment the only one put into practice. The Analytical Psychology of C. G. Jung, and the Individual Psychology of Alfred Adler, also have their disciples; and in theory and practice they differ as greatly from those of the Freudian school as they do from one another. Originally, both Jung and Adler were followers of Freud, but in time they came to break away from him, in order to develop systems of their own.

ANALYTICAL PSYCHOLOGY

Jung proceeded to build up an even more metaphysical theory than that of Freud, incorporating into it his doctrines of the universal life urge, and of the racial and archaic origin and nature of much of the Unconscious; his distinction of individuals into psychological types (extravert and introvert, with their sub-divisions); and

his view that the dream is not merely the symbolic expression of a thwarted infantile wish, but that it also provides "symbolic guidance for the present and the future". His method of treatment does not end with the breaking up of the transference¹ of the infantile phantasy upon the analyst; but, after coming to the end of the word associations and symbols that lead to the discovery of the personal Unconscious, he proceeds to analyse still further, and probes into the universal racial Unconscious itself, which, in his view, the individual inherits. By this means he claims to reach the ultimate and real meaning of the archaic imagery, and to secure his results in the way of cures.

INDIVIDUAL PSYCHOLOGY

Adler, on the other hand, has a far simpler and more immediately human theory to offer than either Freud or Jung, in that he substitutes the "will to power" for the sexual urge (*libido*) of the former and for the "will to live" of the latter. Any thwarting, especially during infancy, of this "will to power" by unsuitable treatment or surroundings, or by any denial of expression to it because of a real, or fancied, organic disablement, brings about the inferiority complex that lies, so Adler teaches, at the root of all the neuroses, or cases of "nerves". Stress on the effect of early treatment upon the child in forming what he calls its "life-style" leads Adler to study the "family-style", and the way in which the "life-goal" of the individual has issued from his efforts to adjust himself to the demands of his family. If the adjustment has not been satisfactory, a morbid "life-style" in which the Self is over-valued may ensue and result in one or other form of neurosis, of which the

¹ Cf. p. 34.

symptom is likely to show itself in any organ or function of an organ that is or has ever been below the normal.

The Adlerian treatment may be described as re-educational. It aims at showing the patient how his "life-style" has been affected by the "family-style", and his "life-goal" warped by excessive over-estimation of his own Ego. The patient is brought to see that he is evading the difficulties of life rather than facing them squarely; he is avoiding the three great challenges of social, vocational, and marital life, by taking refuge in his own phantasies. And he is encouraged throughout the course of treatment to rearrange his values according to a plan of life that aims at a personally accepted and really worth-while goal.

THEORETICAL DIFFERENCES

From the preceding brief indication of the theories and curative methods of the three leaders of the principal schools of medical psychology it will be seen how greatly they differ in both respects. Yet despite this fact Freudians, Jungians, and Adlerians, as well as medical psychologists who are not strict adherents of any one of these systems, all have remarkable successes to their credit in the sphere of treatment. To what, we have to ask, can this be due? Is it that an underlying agreement of the three theoretical systems is possible, and that in fact they are all only emphasizing different aspects of the same causative factors of nervous disturbance? Or, quite apart from theory, are there common factors that enter into all the different methods of treatment? Crichton-Miller cites Dr. Bernard Hart and Dr. T. W. Mitchell as appearing to answer the first question affirmatively. Though the interpretations of the phenomena differ so profoundly in the three systems, yet each

succeeds in throwing light on some of the facets of those phenomena more satisfactorily than the others. And just as modern physical science (the analogy is Hart's) has succeeded in uniting the emission and wave theories of the propagation of light "in a single unifying conception", so these divergent views of the rival medical psychologists may come to be synthesized in the end. As we shall see, however, there would appear at present to be insuperable difficulties in the way of such a synthesis.

PRACTICAL AGREEMENT

Be this as it may, it would seem to be certain that one or more common factors do enter into all these methods of medical psychology. There is, for instance, the probing for, and the discovery of, the origin of the "nervous" disorders in early, and even in infantile experience, a search in the remote past of the patient for the disposing causes of his present malady. As we have seen, Jung probes even deeper than this into the racial Unconscious; but his method of analysis certainly includes early personal experience also. The realization, or re-living, of the old situation ("catharsis", or mental purging, transference, understanding, etc.) makes for a cure. This may be said to be an established fact of experience.

There is, further, always an emotional attitude set up on the part of the patient towards the physician, whether this be definitely aimed at as a curative measure (transference) or merely allowed to develop, as it inevitably does, during the course of treatment. This emotional relationship between patient and physician introduces a large element of suggestion, not necessarily involving even light hypnosis, but none the less prestige suggestion

of a very strong kind. At one time the Freudians commonly denied that suggestion entered into their method of treatment; but Freud himself has since written that "we have only abandoned hypnosis in our methods in order to discover suggestion again in the shape of the transference."

A third factor that seems to play its part in all these methods of treatment is physical relaxation, which, even apart from suggestion and the laying bare of unconscious complexes, of itself has a most beneficial effect.¹ And with this muscular relaxation is connected the question of breathing. Many medical psychologists definitely instruct their patients to breathe slowly, deeply, and rhythmically while they passively allow their voluntary muscles to de-tense; but even in the absence of such instruction the muscular relaxation of itself tends to induce a slow and regular rhythm of breathing that has a definite curative value. It has been pointed out² that the breathing process is the only normally vegetative function over which we have any direct voluntary control; and that, through it, we have an indirect means of influencing other vegetative functions of the body, including those of the autonomic nervous system and the ductless glands. It is known that the secretions of these ductless, or "endocrine", glands, as well as muscular tensions and relaxations, are intimately connected with the experience of emotions such as rage or fear. And fear, often connected with the sense of guilt, undoubtedly plays a very great part, not only in the prolongation of morbid conditions whether physical or mental, but also in the causation of functional nervous disease. If the fear

¹ Cf. E. Jacobson, *Progressive Relaxation*; Chicago, 1929.

² Cf. G. R. Heyer, *The Organism of the Mind* (translated by E. and C. Paul); London, 1933.

can be lessened or removed by any means, the glands will be enlisted in the service of health and vitality ; and the restoration of their normal functioning will certainly bring relief. But this result is not easy to achieve directly. It is more practicable to displace the anxiety in a round-about way by acting on the glands in question by means of breathing exercises practised during bodily relaxation.

It would seem, then, that these four factors at least enter into all the curative methods that are commonly followed by practitioners who own allegiance to the different schools, as well as by those of more eclectic tendency. And, notwithstanding divergences of theory, and even despite them, these factors may suffice to account for at least some of the favourable results of the different forms of treatment.

UNORTHODOX METHODS

But it might be argued—indeed it has been argued—against the claims of the medical psychologists, that similar successful results are obtained by other, and less orthodox, methods, such as those of Christian Science (with or without its “absent treatment”), pilgrimages to holy places and shrines, or one or other of the many faith cures that are offered to credulous sufferers. And, indeed, the argument has some weight, for it must be admitted that “cures” are sometimes effected in these many and various ways. It is accordingly worth while to enquire why this should be so ; for here we may possibly find another factor that enters into all forms of psychological treatment. And in fact we do. This is the factor of belief in, and expectation of, a cure, together with the confidence that derives therefrom. Every medical man realizes the importance of securing this state of mind, this general attitude towards disease and

health, no matter what the disease may be, as a potent aid to whatever treatment he may be giving. The medical psychologist, more deeply acquainted with the conscious and unconscious working of the mind than his non-psychological colleagues, understands even better, possibly, than they do what must be done, and what avoided, in order to induce it. He knows how necessary it is to discover the true mental origin or aggravating circumstances of the malady in order to deal with it successfully. He knows, too, that confidence cannot be inspired in the patient until the deep-seated sense of guilt, for example, or of fear, has been uprooted. And it is because of lack of such knowledge and the skill to make use of it on the part of the sufferers themselves that, with the best will in the world, the unorthodox methods mentioned above are in the vast majority of cases so utterly useless.

Medicine, however, in its widest scope is not only a science, but also an art, making use of many physical and biological sciences in order to obtain its results; and the branch of psychological medicine is no exception to this, save that it relies more particularly upon a single science. And this, psychology, although it has made enormous strides forward since the end of the last century, has still an enormous distance to cover. It can hardly be a matter for astonishment that there are still conflicting hypotheses advanced to account for the pathological conditions that have been studied; but it certainly is a matter for congratulation that the methods of medical psychology have been so perfected.

GENERAL AND MEDICAL PSYCHOLOGY

If criticism other than that which obviously arises from the conflict of theories within this sphere were to be

offered, it would be on the lines that the medical psychologists for the most part have separated themselves off too closely within the boundaries that they themselves have built up around that part of psychology in which they are particularly interested. Other students of the science have been only too ready to accept from them the very valuable contributions they have had to offer towards the construction of a general systematic theory. But for the most part they seem less disposed to embody the discoveries that have been made in other branches of psychology into their own systems. Possibly for their immediate purpose of practical application it is not necessary that they should have done so. Yet any comprehensive future science of psychology will have to take all the observable facts into account. There can of course be no criticism on the ground that the medical psychologists come to their study from the angle of nervous disease, since it must be recognized that the phenomena in which they are chiefly interested are no more than exaggerations of the individual differences that are to be found in lesser degree in so-called "normal" people. For that reason also it is perfectly legitimate to make use of their findings as to fact in any general science of psychology, just as it is legitimate to make use of the observed facts of the comparative psychology of animals, children, and primitive peoples in the usual genetic approach. For all such facts have to be taken into account in any general theory. Nevertheless, the explanatory concepts that enter into the theory must not be mutually contradictory; and, unless strict determinism can be reconciled with purpose and aiming at ends, the psychologies of Freud, Jung, and Adler, as they stand at present, can no more enter into a common system than those of Watson and McDougall.

Apart from this, however, there are a number of conclusions of normal psychology that could with advantage be embodied in the medical systems. What has been established in respect of general mental ability and its distribution throughout the population, what is known of perseveration, of oscillation, of fluency, and of "will", in the sense of persistence of motives, all these things could there well be taken into account. Indeed, there would be the greatest promise in a joint investigation in which the experimental psychologist, the physiologist, and the medical psychologist should co-operate with a view to pooling their results. Something of this sort has already in fact been attempted; but it must be admitted that, even so, the different interests have been kept too much in water-tight compartments. Perhaps a "philosopher of the psychologies" might bring about a systematic synthesis; but to pursue that line of thought is beyond the scope of the present work.

PSYCHOLOGY AND DISEASE

After these rather abstract and general considerations the reader may welcome some concrete information as to what diseases may be benefited by treatment along the lines of medical psychology. The difficulty here is to give a list, because, as was said above, any disease may be complicated by factors of mental origin, such as anxiety and fear; and from this it would follow that psychology might be useful in the treatment of all diseases.¹ Certainly, in those cases in which physical ailments are diagnosed as having been aggravated by such factors psychological methods are indicated, since their use would tend to break up the vicious circle of repercussion

¹ Cf. W. Brown, *Mind, Medicine, and Metaphysics*; Oxford, 1936.

between the bodily condition and the mental reaction to it, and so would place the patient in the most favourable state for recovery. As an illustration one might take even so serious a disease as prostatitis, which, in some cases, yields to these methods without necessitating an operation. Where physical ailments are caused by such factors, psychological treatment is still more plainly indicated. And these ailments, as was amply illustrated during the European War, are legion:—functional paralysis, sensory disturbances (such as blindness, deafness, anæsthesias of various sorts), loss of speech or memory, tremors, muscular contractures, and the like. Even more obviously do the anxiety and compulsion neuroses, that give rise to so many phobias (unreasonable fears of open or closed spaces, of heights, of food being poisoned) and manias or obsessions (compulsive touching, stepping, hand-washing, arson, stealing, belief that one is being persecuted), call for medico-psychological treatment. Hysteria and hysterical splitting up of the mind, the restriction of consciousness and so-called dual or alternating personality; conditions such as a feeling of personal insufficiency, depression, or loss of interest in things or people; and a host of other neurotic ailments fall under similar headings. Add to these diseases morbid habits like alcoholism and drug addiction, and we have a formidable list of troubles that are directly amenable to psychological treatment. When we remember that all these conditions may occur in any degree of severity, and that it has been estimated that in the British Isles alone there are no less than three million people suffering from nerves in one form or another and in need of treatment, it will be appreciated how extremely important are the possible applications of psychology to medicine.

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CHAPTER XII

CRIMINOLOGY AND LAW

LIKE juvenile delinquency,¹ adult crime is coming to be regarded by psychologists more and more from the point of view of maladaptation to social conditions rather than from that of guilt; and reformation of the criminal by remedial measures is beginning to be considered the most important aim of "punishment". Originally, in all likelihood, wholly vindictive and personal, in that the injured party took matters into his own hands and satisfied his lust for revenge by inflicting injury in return upon the person or property of his aggressor, punishment came to be socialized without at first losing its vindictive character. It also took on an aspect of justice or equity, in so far as it came to be made to fit the crime, and was no longer left to the caprice of individuals. It was then still, however, a case of "an eye for an eye, and a tooth for a tooth". But vindictive retribution does not really meet the needs of society unless it secures also protection from a repetition of the crime, either on the part of the offender himself or of others who might commit a similar offence. So far as society is concerned, the aim of punishment is deterrent and protective; and from the purely social point of view whatever means may secure this end should be sufficient. Clearly, the ideal means to employ, if this were possible, would be to do away with the causes and conditions of criminality whether

¹ Cf. p. 100.

environmental or internal ; and something has already been attempted along these lines in the way of the social services, though much still remains to be done. Slum clearing and housing, health and unemployment insurance, medical services, the provision of playing-fields, old age pensions, and the like, belong to a movement which, though not launched with any special view to preventing crime, but on general humanitarian principles, in point of fact does tend to remove some of the conditions that foster it.

But, even if all the environmental conditions were perfect, there would still remain to be reckoned with the internal and psychological causes that make for wrongdoing. And, again, as in the case of the delinquent child, there may be a great many of these causes, such as the excessive development of one or other of the instinctive trends, general emotional instability, feeble-mindedness, and the like, or any combination of them. Since it is known that some of these conditions are hereditary, the whole situation might be met by eugenic methods ; but the problems of eugenics are exceedingly complicated and controversial ones, and need not be further discussed in detail here.

PATHOLOGICAL CAUSES OF CRIME

What should not be overlooked, however, is the fact that, certainly in very many cases, the criminal mentality with its consequent anti-social behaviour is the product of causes which are pathological in nature ; and that treatment of the underlying pathological factors rather than punishment is indicated. For a long time now this has been recognized by psychologists, and it is a fact already becoming recognized also in our courts of law ; though the number of the offences that the psychologist

would include in any list he drew up of crimes that might be pathologically motivated would be greater, and much more comprehensive, than that which the man of law would at present usually admit. Apart from many forms of sexual misdemeanour, for which magistrates not infrequently do prescribe medico-psychological treatment rather than convict to prison, cases of arson may in fact be cases of compulsive pyromania; theft may be compulsive kleptomania or due to uncontrollable fetichism; ink-throwing and dress-slashing may be caused by obscure erotic impulses; and so on. The psychologist's list would be a fairly long one; but, against each entry in which he would note a possible pathological factor, there would be another entry where no such factor would be recorded. In other words, a given anti-social act may be a crime, or it may be the result of obscure mental mal-functioning over which its perpetrator has little, or perhaps no, control. To distinguish in each individual case is not always an easy matter, even for the expert. As in child guidance, vocational guidance, and psychotherapy, a thorough background knowledge of psychology, as well as much practical experience, is necessary here. And it must be confessed that advances made in this direction have not been so marked as those considered in the chapters on Educational, Industrial, and Medical Psychology.

CRIMINOLOGICAL TESTS

It has been proposed to make use of certain well-known tests in attempting to discriminate between criminal and non-criminal misdemeanours—tests that have already been used in the detection of crime, and also for the discovery of unconscious conflicts and complexes in hysterical and neurotic patients. For example, there is

a laboratory experiment by means of which it is not difficult to discover which of two persons has committed a "staged" theft, burglary, or murder. An imaginary "crime" is typed out and placed in one sealed envelope, while a sheet of blank paper is enclosed in a second one. These envelopes are given to two "suspects" respectively, with the instruction to withdraw into another room and read carefully whatever may be found inside them, and at a given signal to return to the laboratory. Meanwhile a list of words has been prepared, of which the first few have nothing whatever to do with the "crime". Later in the list, however, words closely connected with it are inserted here and there. When the two "suspects" return to the laboratory, they are seated, and instructed to reply, as quickly as possible, with the first word that comes to their minds after hearing each word read from the list; and their several reaction-times are recorded with stop watches. An examination of the nature of their reaction-words, and the lengths of time taken to react to the significant words of the list, compared with the average length of all the reaction-times, seldom fails to indicate the "criminal", who betrays himself by hesitating unduly at the incriminating words, or by replying with one that obviously points to his "guilt".

Though this, as was said, is a laboratory experiment or demonstration, it is quite applicable to ordinary life. The author remembers the case of a colleague who made use of this word-test to discover which of two suspected servants had stolen some jewellery from a drawer in his bedroom. He asked the two to assist in an experiment, and made his list of words up as usual, slipping in here and there such words as "ring", "gold", "bedroom", "drawer", "theft", with the result that the guilty testee revealed herself, and the jewellery was recovered.

A test of this kind can be supplemented by others which, so it is claimed, are even more certain and delicate. Marston claims,¹ for instance, that changes in the systolic blood pressure always occur when a person is attempting to deceive by lying; and the indications given by use of the so-called psychogalvanometer undoubtedly point to physical disturbances caused by emotional experience which would almost certainly arise in any probing of a crime which the criminal had on his conscience. In its more usual form, this instrument consists essentially in a Wheatstone bridge, two of the resistances of which are fixed in a definite proportion, while a third is variable. The hand of the subject to be tested is engaged in the circuit as the fourth resistance, electrodes being placed on the palm and back surfaces, and the variable resistance is altered until the bridge is balanced, the hand and variable being then proportional to the two fixed resistances so that no current flows through the galvanometer coils. In these conditions, if the galvanometer needle swings it can only be because the resistance of the hand has changed. Drops in resistance are known to occur when nocive stimuli—that arouse fear, for example—are given, or even threatened, when erotic feelings are stimulated, and when emotions of other kinds are consciously or even unconsciously experienced; and their amount can either be observed and measured, or registered photographically, by reflecting a pencil of light from a mirror attached to the needle upon a scale or moving film. And inferences as to the nature of the emotions provoked may be drawn.

It has been proposed to use such devices not only, as was said, for purposes of discrimination between respons-

¹ W. M. Marston, "Systolic Blood-Pressure Symptoms of Deception"; *J. Exp. Psy.*, 1917.

ible and irresponsible wrongdoers, but also between malefactors of either kind and the innocent. In theory, if all other conditions could be kept constant, and nothing but the misdeed or its absence were involved, this might be possible; but so many other factors may enter into the situation that in practice it would be an exceedingly dangerous procedure to rely upon. Individual differences in general or special emotionality are very considerable; and a timid or shy person might readily give reactions that would easily be taken as evidence of guilt, whereas a phlegmatic and stolid individual who was really guilty might possibly give no reaction at all. In the present state of our knowledge, tests like these are subjects for exceedingly interesting laboratory investigations; but they are hardly to be recommended for use in courts of law. In time they may perhaps come to be refined and perfected so as to be of some greater practical service in criminology; but as things stand the most experienced of psychologists could scarcely recommend conviction or a judgement of "not guilty" on the strength of their results alone. At most he might infer from them a more or less strong possibility that might suggest a need for further investigation.

VALUE OF HUMAN TESTIMONY

This leads us at once to another question upon which psychologists have a good deal to say, and some valuable contributions to offer towards the solution of at least one legal problem. It is that of the validity of human testimony, which depends upon a number of factors that are not always sufficiently taken into account in estimating the worth of evidential statements. Unlike documentary evidence which can be produced in its original form and without alteration, it is the exception rather

than the rule that remembered events should faithfully reproduce their originals. Hearsay evidence, as such, is not admitted in courts of law ; and, indeed, experiments in serial remembering have shown how distorted and falsified a story passing from mouth to mouth becomes in a very short time. " Epithets are changed into their opposites ; incidents and events are transposed ; names and numbers rarely survive intact for more than a few reproductions ; opinions and conclusions are reversed—nearly every possible variation seems as if it can take place, even in a relatively short series." ¹ But even in recalling a story a short time after one has read it, and then, after longer periods spread out over a considerable time, the same person will distort it in various ways, by omissions, inventions, rearrangements, and transformations. In connection with this, rationalization, or " the reduction of material to a form that can be readily and ' satisfyingly ' dealt with ", is of great importance. The event remembered is not seldom remembered as it ought to have occurred in the judgement of the person recalling it rather than as it actually did occur. These facts are often apt to throw grave doubt upon the credibility of eye-witnesses giving evidence in legal cases, even though they should have no wish or intention to deceive, nor any other aim than to tell " the truth, the whole truth, and nothing but the truth ".

Many years ago, however, this same problem of the credibility of witnesses was investigated experimentally by L. W. Stern, and whenever the experiments have been repeated as laboratory exercises they have yielded similar results. In Stern's experiments pictures were shown to the Subjects of the investigation, the instruction being given to observe them as attentively as possible with a

¹ Cf. F. C. Bartlett, *Remembering* ; Cambridge, 1932.

view to being able to describe in detail what they had seen later on. The Subjects were also warned that they would be asked questions about the pictures. When they had been allowed to study the exhibits for a time, they were asked to write out their descriptions as fully as possible. It was found that, in comparison with the detail of the pictures, very little indeed was recorded in their written reports, and that, even then, some fifteen per cent. of their statements was either false or inaccurate. Moreover, when asked to attest to these statements on oath, they were prepared to a large extent to do so. And, whether given freely or on oath, the inaccuracies were found to increase with lapse of time.

SUGGESTION

A further refinement was introduced by the subsequent questioning. Straightforward questions, like "Did you see a . . . in the picture?" may provoke a straightforward answer; though even in these questions there is a suspicion of suggestion, a belief, since the question was asked, that there must have been such a feature to be reported; and this may lead to an unintentional falsification, in the case of a very suggestionable person. A far greater degree of suggestion enters into leading questions, like "What stood on the table?" which by inference implies that something was actually there; or "What were the colours of the flowers in the vase?" when there were neither flowers nor vase in the picture. Indeed, practically any question may be so framed that a greater or lesser degree of suggestion enters into it; and it must not be forgotten that, having regard to the questioner and the person questioned, this suggestion may frequently be prestige suggestion of a very potent kind. This is especially the case when children are

questioned by their elders. Not only are they (and the younger they are the more prone they are to succumb to it) readier to accept suggestions, but, as we have seen,¹ they are apt in any event to confuse their phantasy imaginations with reality; so that it is far more difficult for them to distinguish between the true and the false, and far more easy to elicit false answers from them to subtle questioning of a suggestive kind.

That this constitutes a positive danger in the administration of the law when conclusions are based upon human evidence cannot be denied; and there are fairly recent cases on record in which most serious miscarriages of justice have occurred because of false testimony given in all good faith. In the old days of witches and warlocks, the lack of any psychological knowledge on the matter in question, the proneness of ignorant and credulous people to suggestion, and especially mass, or crowd, suggestion, and the subsequent testing of the accused by ordeals like those of fire and water, go a long way to explain the excesses that occurred. To-day there is far more knowledge, far less credulity and superstition, and a far broader spirit of tolerant humanitarianism. Yet the factors that make for false, though quite unintentionally false, testimony remain exactly what they were; and those whose business it is to sift and weigh the worth of human evidence in courts of law are none the worse off for an acquaintance with them.

CHILDREN'S COURTS

Since the question of the difference between children and adults in respect of suggestibility has been raised, there is one further point at which psychology impinges upon criminology and the administration of the law to

¹ Cf. p. 98.

which reference may be made here. It is that of the institution of children's courts, where the study and treatment of young delinquents are aimed at early reformation before criminal habits may have become indurated. It was on the basis of work of this kind originally carried out by Dr. William Healy, at Chicago, that Child Guidance Clinics¹ were organized, not so much to reform the delinquent as to prevent delinquency. Since, as we have seen,² phases may be distinguished in the mental development of the individual from infancy to adult age, it will readily be appreciated that different methods are called for at the different phases, in the way of the preventive, remedial, and prohibitive treatment of anti-social behaviour. It is all to the good that this has been recognized as a directive principle in legal procedure; and, once again, it is largely to the credit of applied psychology that this is so.

¹ Cf. p. 99 *sqq.*

² Cf. p. 95 *sqq.*

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LOOKING FORWARD

CHAPTER XIII

THE FUTURE OF PSYCHOLOGY

A TWOFOLD difficulty likely to have been encountered by some readers of this book has to do with the terminology of which it has been obliged to make use. On the one hand, a number of words will have been found to be unfamiliar and puzzling; whereas others, while in constant every-day usage, are here employed, as the reader may have surmised, in a rather strict and technical sense. This is the misfortune of a science like psychology that deals in the main with experience and behaviour with which everybody is well acquainted, but to express which ordinary language has been used from time immemorial. For the sake of scientific accuracy and precision, either a technical vocabulary must be invented, or, if the ordinary vocabulary is to be employed, its terms must be strictly defined. In point of fact both these devices of invention and definition have been followed, so that psychology to-day in part uses specially coined terms, and in part adapts common terms to its own special purposes. It is for this reason that it has been possible to level the very unfair gibe against it "that psychology teaches what every one understands perfectly well in terms that no one is able to comprehend".

It is not the layman alone, however, who suffers from this linguistic difficulty, especially in so far as the terms

borrowed from ordinary language are concerned. Many of these words are most ambiguous to begin with ; and their ambiguity is not always dispelled by the professional psychologists who make use of them. Such terms as "emotion", "sensation", and "consciousness" itself, are cases in point ; and one of the greatest advances psychology may be expected to make in the future will be due to the securing of an accuracy and precision of terminology, comparable to that of other, and particularly the physical, sciences, in its own subject-matter. Indeed, it may be said with some confidence that many of the apparent conflicts between contemporary presentations of psychology, such as have been sketched out in the earlier chapters of this book, are largely due to ambiguities of this sort. When they are got rid of, there will be seen to be far more real agreement among psychologists than may now appear to exist.

The coined terms, for the most part, are due to the system-builders, who in expounding their more novel theories necessarily aim at the greatest clearness and precision. From such sources we get terms like "noe-genesis", psycho-physical "isomorphism", "catharsis", and the like ; and, in respect of these, though they may avoid all ambiguities, there certainly may remain the difficulty of understanding what they mean, and of mastering the doctrines to which they refer in their several theoretical contexts.

SYSTEM BUILDERS AND PSYCHOLOGISTS

The vast majority of psychologists, however, are not, nor do they pretend to be, system-builders. They are content to examine critically the theoretical constructions made by the leaders of contemporary psychological thought, to accept from them whatever appears to be

justified by the evidence, and to go on pursuing their researches and gathering their data in all the different fields of investigation into which the science of psychology has by the process of specialization become partitioned. In this, psychology differs in little, if anything, from the other sciences. There, too, the majority of workers in the various special fields are busy extending the details of knowledge, relating them together, and fitting them into the general framework of their several sciences. From time to time, under the accumulated weight of the evidence of newly observed facts, special principles have been forced to the surface that have been accepted as explanatory of groups of data, though possibly not of application to all the data concerned. More rarely have the great systematizers seized upon more general explanatory principles that embrace the special ones, and bind the groups of data together into larger coherent wholes. Thus Galileo, Newton, Einstein, expanded the framework of physics by lessening the number of special and *ad hoc* explanations of physical occurrences, and stating a few highly generalized principles that are capable of extension to most, if not all, the observed phenomena.

A parallel movement is seen to have taken place, and actually to be taking place, in psychology. Dealt with piecemeal, for example, the phenomena of perception, of conception, of judgement, and of reasoning, seemed to fall into groups for each of which proximate principles of explanation were required. And such proximate explanatory principles were in fact advanced—for example, in the shape of different faculties, a separate irreducible power being invoked to account for each of the performances in question. But just as it had been found, by a stroke of genius, that all the different forms and types of physical movement could be explained by reference

to no more than three simple generalized laws, so it has been shown that all the products of perception, conception, judgement, and reasoning—in short, all the cognitive products of the mind—can be explained also by reference to no more than the three fundamental principles of original cognition. Again, to take a parallel from the process by which physics has been built up into a coherent science, just as the older notion of special forces for special occurrences gave place to that of an energy capable of actualization in various forms, and doing “work” of various but equivalent kinds, so the concept of a single mental energy producing different results by working in different “engines” has gone far towards unifying and rendering coherent the science of psychology so far as the processes of knowing are concerned. And it has already been pointed out¹ that an extension of the method by which the existence of a general mental (cognitive) ability and specific factors of ability has been established bids fair to include the other aspects of mentality, conation or striving, and emotion or feeling, in a still wider generalization. The proximate principles of explanation that are still advanced to cover these aspects will then, it is to be confidently expected, be embraced by more far-reaching ones, and in the end by ultimate explanatory principles.

Another highly significant discovery, the full consequences of which for systematic psychology can hardly yet be estimated, is that of the Unconscious as a dynamic reservoir of psychical energy. Perhaps it is scarcely a too far-fetched use of analogy to compare this with the discovery of radio-activity in physics. Be this as it may, the concept of the individual as being fundamentally a creature of biological needs and strivings that flash, as

¹ Cf. p. 31.

it were, into consciousness in the form of impulses, wishes, and desires, is one that has radically altered the older intellectualistic view of the mind as a smooth waxen tablet, or a sheet of blank paper upon which experience gradually comes to trace its characters in the form of items of knowledge. It has thrown the emphasis upon the essentially orectic, or active, nature of the mind, and it has placed the cognitive powers, or powers of knowing, in their proper perspective as instruments to be used in the service of advancement and achievement.

FEELING, WILLING, AND STRIVING

It is true that, apart from the theoretical constructions of the Hormic and Psychoanalytic psychologists, little has been done in the way of the experimental investigation of the orectic process of feeling and striving. In comparison with the vast amount of work that has of late years been carried out upon cognition, and the exceedingly valuable results it has yielded, the meagre amount of research upon problems of the will, and even of feeling and emotion, and the still more meagre conclusions that have been drawn therefrom, are striking and disappointing. We have no tests of will as we have of intelligence; we have no accurate methods of measurement either of emotion or feeling. A good half, and perhaps the more important half, of personality is still largely a closed book to us, so far as any exact scientific knowledge is concerned. Nevertheless, psychologists may console themselves with the reflection that less than forty years ago exactly the same comment might have been made in respect of those very matters in which psychology has since made the most astounding progress; and, on the strength of that reflection, they may with some justification look forward to a like advance in the sphere of orexis.

A final point that may be touched upon as a possible indication of the way in which scientific psychology is moving towards a more complete and coherent synthesis is that of the Gestalt concept of "wholeness" as an explanatory principle. It would be premature yet to attempt to predict the outcome of its thorough-going application to all the problems of psychology; but it may be stated quite definitely that its psychological implications are in no way necessarily bound up with the physiological hypotheses that have been advanced in its support. That this principle is at present the object of keen criticism and controversy is much in its favour as evidence of the serious challenge it has made to contemporary thought. And already the conclusion appears to be emerging from the discussion that the laws of "wholeness," which have been stated as objective laws governing the process of perception and, consequently upon this, have been extended to cover all other mental process also, must be enlarged to include at least one principle of an essentially subjective kind. Even in so far as perception alone is concerned, we are able to control our manner of perceiving. How a reconciliation of what at present appear to be absolutely incompatible principles will come about, it is impossible to say; but in any completed science of psychology all the relevant facts will have to be taken into account, and the ultimate synthesis reached precisely by way of these statements, refutations, and conciliations. Possibly further research into the orectic, or feeling and striving, aspect of the mind, and particularly into the function of the human will, may provide the nuclear point round which the whole will crystallize out in an orderly and intelligible fashion.

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